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The Greater Buildings at the Chicago Exhibition.

THE preliminary steps in the procuring of designs for the Exhibition buildings were, of course, watched with great interest by the American architects. To Mr. D. H. Burnham, the Chief of Construction, is due the credit, if any, of having vetoed the obtaining of designs by competition. He, no doubt, with his great practical experience as an architect, saw the difficulties and dangers of such a proceeding, at any rate in a case like the present, where a group of buildings had to be designed in harmony one with the other. Moreover, time was short, the designs had to be prepared simultaneously, and this could only be done in a satisfactory manner by frequent consultation between the architects and the Chief of Construction. No surer and no more ideal way of obtaining these satisfactorily can be imagined than by selecting, in this case, ten architects, and forming a council, presided over by the Chief of Construction, whose members could meet in a friendly way and criticise each other's designs to their mutual advantage, and subjugating their own personal feelings to the general advantage of the whole scheme. It is, moreover, a proceeding of no slight importance to English architects that, in a democratic country like America, a blow should have been given to the mania for architectural competitions which is passing through the country at the present time. The position of the buildings and their size having been roughly worked out by Messrs. Burnham and Root (Mr. Root, unfortunately, having since died), and by Mr. F. L. Olmsted, the landscape architect, the designs were apportioned to the different architects, the principal ones on the great court to the New York architects, while the buildings further north were given to the Chicago and Western architects.

It was, of course, apparent that symmetry must be observed in the Grand Court of Honour of the Exhibition, and that any display of a romantic or picturesque treatment must be beyond the formal Reception Court of the Exhibition. It was felt that some treatment on Classic or Renaissance lines must be adopted, and that with a certain standard of dimensions and modules of proportions, sufficient variety in unity could be obtained to give the whole scheme that personal quality which is so essential in architecture, but which, if uncontrolled, is liable to run in the opposite direction. The buildings are, therefore, planned in relation to each other and on axial lines. A general cornice line of 60 ft. from the ground was then agreed upon as being suitable to the requirements of the case in relation to the court, and further it was agreed that the module of proportion as to their façades should be a bay not exceeding 25 ft. in width. Beyond this, each architect was left to himself to develop his own design, with the aid of the mutual criticism which occurred at the meetings of the architects.

The selection of the material to be used in the erection of the buildings had, of course, to be carefully considered in every aspect as to appearance, suitability, and cost, and also as to salvage at the close of the Exhibition. Various reasons operated in inducing the architects and the Chief of Construction to adopt the use of staff as the material in which to carry out the designs committed to their charge.

Chicago is one of the great centres of the timber trade; timber of all sorts and sizes is shipped there, and it is the cheapest possible building material; it could be used in stock sizes, and this has influenced the designs to a large extent, and when the buildings are pulled down at the end of the Exhibition the salvage will be considerable, and the timbers being used in marketable lengths will render them easily saleable. As a covering to this woodwork, staff was eminently a material capable of being manipulated with ease for the purposes of architectural decoration, and of sufficiently durable properties to make it last the period for which the Exhibition buildings would be required. The material, which was used for some of the smaller buildings at the last Paris Exhibition, is composed of one part best Portland cement and five parts plaster of Paris to which enough long hemp fibre is added to bind it thoroughly together. This is then nailed in blocks with long round nails to the wooden framework, the joints made good with plaster of Paris, and the whole cleaned down. The effect is an effect entirely its own; it resembles white marble a good deal, but is preferable under a strong sun in having no perceptible glitter, while against a dark blue sky or at night with the electric light on it the result is very fine.

The Administration Building, by Mr. Hunt, President of the American Institute of Architects, is, from an architectural point of view, probably the most important building on the grounds, in that its purpose is to serve as the grand entrance portal to the Exhibition.* As has been mentioned, it has been placed on the western extremity of the main axis of the great court, its transverse axis running north between the Mines and Electricity Buildings, &c., through the chief entrance of the Machinery Hall.

On the west is the great Railway Terminus, with its immense hall designed after the Baths of Caracalla at Rome. This station empties the crowds of visitors into the Central Dome, which forms a fitting vestibule to the Exhibition itself. Looking straight in front after entering, through the eastern doorway a view of the great fountains is obtained, and beyond, at the other end of the great basin, 1,100 ft. by 350 ft., stands the statue of the Republic, with the peristyle beyond, with its centre crowned with a quadriga, through which is seen the broad expanse of Lake Michigan, which is itself 60 miles across.

From the importance of the position, it thus became necessary to have entrances on each of the four sides of the structure, because of the importance of all of them. The area given to Mr. Hunt was a square of 260 ft., and on this he projected a structure, the centre of which is an octagon carried up into an octagonal dome, whose internal diameter is 120 ft., and internal height 220 ft., and external height 275 ft. It will thus be seen that the dome on plan is 12 ft. wider than that of St. Paul's, London, that the height of the interior dome is 20 ft. lower, and that of the exterior about the same as our Metropolitan Cathedral, not, of course, including the lantern. Round this inner octagon is placed an outer one, about 24 ft. deep, the space between on the diagonal sides being occupied by staircases and lifts, and on the entrance sides by the vestibules and colonnades. On the diagonal sides are four pavilions 84 ft. square, and four stories in height,

* We gave an illustration of this building in the *Builder* for August 8, 1891.

in which are accommodated the various departments of administration, such as the fire, police, ambulance, and foreign departments. These four pavilions are 60 ft. high to the top of the main cornice, which is the height agreed upon by the architects for the main buildings on the great court, and this brings the pavilions into relation with the façades around it. The pavilions are enclosed under one Doric order raised on a pedestal, and with an entablature and balustrade above, and are covered with a flat roof; and on each of the three angles is placed a group of statuary, allegorising the Elements and their capacities, and other subjects.

There is a severity and dignity in the Doric order to these supporting pavilions, which contrasts well with the more elaborate Corinthian order adopted in the main buildings on either side. Between these pavilions are recessed the great portals to the dome, one on each cardinal face, being flanked with sculpture representing the elements, "Fire," "Water," "Air," and "Earth," on one side of each doorway in its natural unsubdued state, and on the other in the service of man.

The elevation may be said to be divided into three parts in height, the pavilion story, of which we have just spoken, the colonnade story, and, lastly, the dome. In the colonnade stage, which is about 70 ft. in height, the diagonal corners containing the lifts and staircases are continued and boldly expressed, being taken out square on plan from the diagonal face of the octagon, thus forming a longer space for the Ionic colonnade which occurs between the angles; each of these angle pavilions is covered by a dome, coated with aluminium bronze, supported on the angles with two groups of statuary representing the culminating points of human nature, such as Art and Science, War and Peace, &c.

The third stage in the design, consisting of the dome itself, rises on the inner shell, thus forming an external walking way above the colonnade; it rises vertically for a height of 30 ft., being octagonal on plan, and ornamented with flat pilasters, between which are three panels on each face, on which are inscribed the names of men famous in science, art, and industries. Above the cornice which surmounts these pilasters are placed eagles at each of the edges of the octagonal dome; from this point rises the external dome, with three long panels on each face, reaching nearly to the top, the main ribs continuing till a height of 275 ft. is reached. The whole is covered with a glazed skylight 38 ft. in diameter. The panels of the dome are treated in aluminium bronze, as are also those of the smaller angular domes mentioned. The remainder of the exterior has been kept white with the exception of the wall behind the colonnade, which has been painted a red terra-cotta colour, which serves as a background for the Ionic columns and emphasises this part of the design.

Mr. Hunt's building differs from most of the other great structures in having an interior as important as the exterior. Each of the faces of the octagon internally is occupied by a semi-circular opening; four of these form the entrances and four open into the space containing the lifts and staircases, with a floor at the level of the springing of the arches. Above is a frieze 27 ft. wide, filled with figures in low relief on each side. These figures are in white on a light blue ground. Surrounding this frieze is a heavily decorated cornice supporting an immense gallery, projecting about 3 ft., above which rises the octagonal drum of the dome itself, ornamented with slightly projecting pilasters; between these at the top are placed latticed windows lighting the interior. The interior dome, introduced as at St. Paul's and elsewhere for the purposes of proportion, starts from the cornice which crowns these pilasters and finishes at a height of 190 ft. from the pavement, with an opening 50 ft. in diameter which admits the light from the opening in the outer dome. This interior dome is treated with ribs and panels and painted in light blue and gold. The whole of the upper part had to be decorated by the electric light by Mr. W. L. Dodge, because of the scaffolding, and this may have influenced the scheme of colour to some extent. In our opinion it is in somewhat too light a key; something bolder and stronger was, perhaps, wanted for such a composition and on such a scale. Through the inner opening the light penetrates from the opening at the summit of the outer dome, which is painted internally by Mr. Dodge with an allegorical group entitled the Glorification of the Arts and Sciences consisting of Apollo as a central figure, with a procession extending around the dome representing the arts, sciences, and industries. The great drawback of this piece of work is that it is impossible to see it to advantage; only a portion of the composition can be seen at one time, the inner portion being somewhat awkwardly cut off by the inner dome. It is worthy of note that Mr. Hunt had in his mind when designing this dome the great uncovered opening in the Pantheon at Rome, and that he intended to carry out the same idea in his own building, but that questions of utility and climate intervened, and he thought of the great central space in showery weather not being available for use as a shelter, and reluctantly abandoned the idea and glazed the outer surface. The effect, however, of the central lighting remains the same.

There can be no doubt that the composition as a whole is a most effective one, and forms a fitting reception hall to the Exhibition. The idea of having a monumental headquarters does not seem to have occurred to previous projectors of great exhibitions, and it is certainly a new departure. This monumental dome of Mr. Hunt's will bear the same relation to the Chicago Exhibition, as Paxton's glass-house did to our own 1851 Exhibition or the Eiffel Tower to the last Paris Exhibition. Granted the fact that an exhibition wants its various departments of management, and you have at once the key-note to the idea, and if they can be placed in a building so designed as to raise it to the dignity of a monument and forming a grand entrance vestibule to the whole Exhibition, it is at once a logical and a proper thing to do.

In this respect the administration building is a long way ahead of the Eiffel Tower at the last Paris Exhibition, which, besides being ugly and out of scale, was practically useless with the sole exception that it formed a landmark of the Exhibition.

About the sculpture in the building little has been said, it being proposed to treat of this separately in a future article. We must, however, mention that Mr. Karl Bilter, of New York, is the sculptor, and that he has treated it in such a manner as to aid the general effect. The whole scheme consists of twenty-eight groups, the most remarkable of which are the four elements: "Fire," "Water," "Air," and "Earth," allegorised and placed at the four great entrances. On one side is the element in its natural unsubdued condition, while on the other side it is represented in the service of man and subdued by him. The idea is a novel one, and has been well carried out. It is a curious point, but no illustration yet published has, in our opinion, done justice to this Administration Building by Mr. Hunt; in the illustrations, and even in photographs, the building has a hard appearance which does not belong to it in reality.

To the south of the Admistration Building, and having a frontage of 840 ft. on the great court and 500 ft. to the S. Canal, stands the Machinery Hall, by Messrs. Peabody and Stearns, of Boston. To give an idea of the extent of the structure, it may be mentioned that in comparison with the Houses of Parliament at Westminster, it stands in the relation of five to two as to superficial area. In designing these great structures the architects had in every case to consider that the form of the structure and the composing materials should be of a marketable nature at the conclusion of the Exhibition. These conditions induced the architects to plan three typical railway sheds 130 ft. wide, placed alongside one another, the naves running east and west, with a height of 100 ft., and supported on trusses 50 ft. apart, centre to centre. These trusses are built up, the inner and outer members connected with lattice bracing. One point about the ironwork is that it has only been oiled at the works and left in that state, several thousand pounds being thus saved, while the effect is infinitely superior to ordinary painted work, a certain amount of tone being obtained of varying dull reddish brown tint which is very pleasing. The trusses are connected at the top with a pin connection, and also rest on a steel pier at the base, as the roofs at the Paris Exhibition of 1889.

Crossing these great naves at right-angles, and on the axis of the main north entrance, is a transept of the same width, covered by three iron domes of the same diameter, and raised on low drums, and the pendentives filled in with light iron framing. These domes give a justifiable, and indeed necessary, importance to the main nave, from which the others open out on each side, and which, when entered from the main entrance on which it abuts, opens out well in front of one, and prevents any confusion likely to arise from two naves of the same width crossing one another. The interior of the building proper contains no galleries, as in most of the other great buildings, the machines of course requiring a good clear height.

In the four angles are circular staircases leading to the galleries, both interior and exterior, formed in the enclosing architectural screen which envelops the internal structure; besides which, on either side of the north and east entrances, are spacious staircases. As has been said, the architects to the great court agreed that covered ambulatories should be provided on the ground floor for the purposes of shelter from the great heat of the sun at Chicago in the summer months, and also for a shelter from the heavy showers which come on without much notice during unsettled weather. It was also agreed that for the purpose of general effect and of symmetry the height of the main cornice should be 60 ft. The plan of the Machinery Hall then developed itself. The enclosing screen, 50 ft. wide, encircling the main structure where it crosses at the angles, naturally resulted in pavilions, 50 ft. square, at these points, while in the centre of each façade covered porticos are so designed as to emphasize the main entrances. The façade is laid out on centres which are multiples of the main trusses, placed 50 ft. apart, four divisions occurring to each bay, and consists of a lower rusticated storey, forming an ambulatory, and pierced with semi-circular arches and rusticated, upon which rests an open colonnade of Corinthian columns, crowned by a cornice and entablature. The treatment reminds one somewhat of Perrault's colonnade at the Louvre, in Paris. The central *motif* in each façade takes up, with the two towers, the width of the nave of 130 ft. wide, which is thus truthfully expressed externally. In order not to form too strong a contrast at the angles, and to bring these pavilions into relation with the screen wall, the Corinthian colonnade is continued round these, being slightly projected in front, and thus gaining a shadow effect. These pavilions are crowned by circular domes raised on a circular drum, pierced with semi-circular headed windows, which light the interior glazed dome, the outer dome being crowned with a lantern, bringing the whole height of these up to 130 ft. The angles on plan left by placing a circular dome on the square base are filled up with open campanili of small Corinthian columns supporting a concave roof, these features being richly treated with finials, &c., in the most ornate Spanish Renaissance manner.

The two main entrances are treated in a very bold manner. It seems as if the architects had determined to get contrast at all costs with the elaborately treated main colonnade. All the main horizontal lines are stopped against the perfectly plain face of the lower part of the two towers flanking these entrances, which start boldly up from the ground without any base and perfectly plain for a height of 90 ft., when they are connected across the central entrance with a strongly-marked horizontal cornice. Upon these towers are raised very elegantly designed campanili on Spanish Renaissance lines in three gradually diminishing stages on the north front, and in four stages on the east front; those on the north being apparently kept lower, so as not to interfere with the Administration Dome. The towers on the east façade contain a very fine peal of bells, whose tone and rendering remind one forcibly of those so well known at Bruges, Ghent, and other Belgian cities, which ring out every day for half-an-hour or so, and give an air and suitability and appropriateness to the whole conception which is very refreshing, and which, if there had been no *raison d'être* in their design, and they had only been placed there for architectural effect, would naturally have been wanting. Each tower is crowned with a winged figure representing Victory. The walls behind the colonnade on the first floor are pierced with windows in two heights, in which Spanish Renaissance dressings are introduced, and figures of infants are largely introduced in the frieze over, holding mechanical tools and bearing festoons of chains of implements instead of the traditional flowers and fruit, &c., and thus bearing out the purposes to which the building is put. The coloured decoration to this covered colonnade is in blue and gold, and the capitals of the Corinthian columns are picked out in gold leaf along the whole façade.

The semi-circular roofs to the great trusses express themselves rising on the inner walls of the colonnade, and are seen from a distance best, being 50 ft. back from the face, and above these, where they occur on the plan, are seen the three domes over the great transept treated simply with a circular drum with louvres for ventilation, and crowned with winged figures.

Returning to the central porticos, the least satisfactory point is, perhaps, the *appliqué* appearance which the two porches have, the circular one 95 ft. deep and 75 ft. wide, and with Corinthian order 60 ft. high, opposite the Administration Building and the square projection porch on the east front. The whole design gains much from the sculptor's art. Mr. A. Waagen has been entrusted with this. Over the semi-circular portico he has placed six figures bearing portraits of prominent inventors, above these and resting on pedestals supported by the great cornice connecting the two towers are five figures 13 ft. high, the centre one representing Science, and those on either side "Fire," "Water," "Air," and "Earth," the two towers being crowned with a figure of Victory.

The pediment in the eastern entrance represents "Columbia" seated on a throne, to the right and left are inventors of machinery, while the lower corners are filled in with lions, representing brute force subdued by human genius, represented by two children.

Messrs. Peabody & Stearns have certainly produced a work which, although designed on strictly classical lines, possesses enough variety in its general features to give it sufficient interest, especially as the architects have adopted the architecture of the land of Columbus as the fountain-head from which many of the ornamental features have been borrowed.

The Agricultural Hall, by Messrs. MacKim, Mead, & White, occupies the larger part of the south side of the great basin to the Court of Honour, and is bounded on the west by the southern portion of the Lagoon, which runs south from the great basin, and on the east by the shore of Lake Michigan itself. The building covers a space of 800 ft. long by 500 ft. deep, being practically the same size as the Machinery Hall, which faces it on the west. There is, besides the main building, an annexe on the southern side of 550 ft. by 300 ft. The main building consists primarily of two central naves 95 ft. wide crossing one another at right-angles on the longer and shorter axis of the building. These are roofed with trusses of very light construction, in this respect differing from the well-designed trusses of the Machinery Hall opposite, which, it will be remembered, were built so that they could be sold for railway stations at the end of the Exhibition. The construction of the roofs to the Agricultural Building is a composite one, wood entering largely into the design; the height of the central nave is 75 ft., and the lantern which runs from end to end of these naves is made entirely of wood.

On each façade is a covered ambulatory, as agreed upon by the architects. Each of the great naves mentioned is accompanied on each side by two-storied aisles, kept sufficiently low to allow of a clearstory being formed in the upright portions of the great naves. Running longitudinally east and west on each side of the aisle to the great nave are planned three further aisles of lower height, arranged with skylights, and two stories in height, the first floor of the centre one being, however, left out for the admission of light to the ground floor, while the roof of this centre aisle is taken higher for the purpose of forming a clearstory. On the outer faces to the façades are formed galleries on the upper floor, the lower portion being treated as a covered colonnade as mentioned. On the east and west sides the galleries on the first floor are about 50 ft. wide, while on the north and south they are only 23 ft. This was necessitated by the placing of the main or north façade, and is expressed truthfully on each face of the building. On the centre of the main front facing on the great basin, and emphasising the main nave, running north and south, is placed a dome, 78 ft. in diameter and 130 ft. high, surrounded internally on the ground floor with Corinthian columns of the same height as the main external order and placed in pairs. The dome is coffered internally. The aisles on either side of this nave are accentuated on the façade by masses which form solid wings to the portico which is placed between them. Where the surrounding galleries meet they naturally form corner pavilions, which are differently treated on each face, in order to properly express the plan, and are crowned with low square pyramidal stepped domes, crowned with a group of four women, representing the four continents of the world, supporting a globe. The motif of the façade consists of a Corinthian order of 50 ft. high, without pedestals, supporting an entablature 10 ft. high. The central pavilion on the north front has eight pilasters, the four central ones having Corinthian columns in front, which are carried up with a small attic with figures, and crowned with a pediment. To each of the end pavilions of the same front are four pilasters, figures also occurring above the main cornice and below the square pyramidal dome. The space or curtain wall between these main features on either side is further divided up by two massive piers, consisting of two pilasters with a doorway in the centre on the ground floor, and which serves not only to prevent monotony in the façade, but also answers the purpose of emphasising these doorways. The main cornice breaks around these projections; above are placed groups of statuary, representing Agriculture in various phases of bucolic labour. Thus the architects appear to have marked the entrances to the structure in a manner befitting their importance; the central, or more important one with eight pilasters, the four central ones having columns in front with pediment over, the end doorways with four pilasters, the pavilion being crowned with a dome, and the intermediate or minor entrances, two to each curtain wall, with coupled pilasters to a projecting pier, and crowned with a group of statuary, while the full-sized order occurring at well-defined points serves to keep the design well knit together. The space between these piers is again further sub-divided into three bays, the lower portions of smaller Corinthian columns, supporting the gallery on the first floor and carrying an entablature at the gallery level, at which point they are connected with semi-circular arches, divided by figures representing the signs of the Zodiac, and supported on projecting Corinthian columns. The spaces between these columns are again sub-divided into three by columns of the same order, which express on the façade the spacing of the wooden columns used internally to support the floors. The façades to the lake and to the small lagoon develop themselves from the plan, the angle pavilions being emphasised and treated with projecting porticoes, crowned with a tympanum filled with sculpture, and on each side, buttressed, as it were, with flanking piers, and crowned with the low pyramidal domes which show, of course, on the main front with the four female figures holding aloft the globe. These porches express on the façade the open aisle extending behind of a width of about 43 ft., the blocked-up portion or flanking piers representing the line of the columns supporting the gallery floors. The central pavilion to these fronts does not project, but is so grouped with the piers on either side as to emphasise the great nave going east and west. These piers are treated the same as on the main front, and are crowned with statuary, while the curtain walls on either side consist only of a three-arched bay split up again into three divisions as before.

The roofs, which are of low pitch and crowned with slight pitch, are seen above the main cornice. The Agricultural Building is by far the richest of the buildings which face the Great Court; not even, we think, excepting the Administration Building itself. It seems, in fact, designed from its commencement for a profuse treatment in sculpture, and it is doubtful which holds the greater prominence in the composition, the sculpture or the architecture proper. The sculpture proposed has been carried out by Mr. Philip Martiny, of Philadelphia, and has been conceived by him in a very bold spirit, perhaps allowable, and even justifiable, by the gigantic order employed throughout the design. Each group represents some agricultural subject. Besides the four corner pavilions already mentioned, Mr. Martiny has produced a group of horses led by two labourers and drawing a chariot in which stands a figure representing Agriculture, and also a group of oxen led by a figure, and drawing the ancient beam plough of Virgil. These two groups, which are duplicated on the façades, are placed over the piers containing the intermediate doorways, and are executed with much vigour. The groups in the four pediments to the porticoes at the ends of the smaller façades, which represent Agriculture, the women holding the signs of the Zodiac over the smaller Corinthian columns, and two groups of the Four Seasons were also executed by Mr. Martiny, while Mr. L. J. Mead, of Florence, has executed the central pediment, representing Ceres, the Goddess of Agriculture. The dome over the central entrance is crowned by a gilded figure of Diana, 18 ft. high, which formerly stood on the Madison-square Tower, New York. The right foot of the statue rests on a small ball, which turns with the wind.

The colour decoration will be more specially noted later; on it has been executed by Mr. G. W. Maynard, a painter of note in the States, and is in the Pompeian style. The central portico and the four end porticos to the minor façades are the points at which colour is applied, and it serves its purpose of accentuating the design at these points where it is needed, besides being under cover, and therefore protected from the elements. The

whole scheme is treated with rather strong colouring, and is composed of figures singly and in groups, relating to agricultural traditions. From these remarks it will be understood that the agricultural building is very rich in its general effect, so much so as almost to be called sumptuous; it might even be said by some that too much sculpture had been used if it were for a permanent building, but for a temporary structure we think it errs, if at all, on the right side. Being designed with its colossal order, and being emphasised also by bold masses of plain masonry, it carries the sculpture applied to it, with a certain sense of contrast, which is very pleasing.

The proportions of the whole are good, and the general setting out of the elevation, so as to emphasise certain features in the plan, seems very well thought out. The broad terrace in front and the broad flight of steps leading down to the main basin also help to bind the whole design, so as to make it form part of the whole scheme, and to cause it to pile up gracefully from the water's edge, which serves as a base to the composition. It is in general effect more sedate than the Spanish treatment of the Machinery Hall, which faces it across the smaller lake, and must add largely to the reputation of the architects, Messrs. Mac-Kim, Mead, & White, of New York, who already hold such a high reputation among our professional brethren in the United States.

SOME EXPERIMENTS ON CONCRETE BEAMS.

THE title of a paper in Vol. CXI. of the "Proceedings of the Institution of Civil Engineers" (1892-3, part I.), caused us to turn to it with considerable interest. The title runs:—"Strength of Concrete Slabs, by Sidney Richard Lowcock, Assoc. M.Inst.C.E." We trusted to find that, at last, some valuable experiments had been made which might furnish data for the construction of concrete floors. The experiments of Colonel Seddon* on concrete slabs, supported on all the four sides and uniformly loaded until they broke, were in the right direction, but further experiments on other kinds of concrete, and more especially on slabs *fixed* on all the sides were needed, so that more accurate constants might be deduced. Our hopes that Mr. Lowcock's paper would disclose the results of such experiments were speedily overthrown, for the "concrete slabs" were neither more nor less than beams, supported at the two opposite ends and loaded in the middle. As far as they go, the tests are useful; we cannot but regret, however, that they did not go further, and if Mr. Lowcock will continue them in the direction indicated by the title of his paper, he will confer a benefit on architects and engineers alike.

A brief *résumé* of the experiments will be of interest. The slabs, or rather beams, were made with good Portland cement (which had a tensile strength of 665 lbs. per sq. in. at 7 days), and "clinker obtained from furnaces which burned ash-pit refuse." The clinker was crushed in an ordinary mortar-mill, and was afterwards passed through a screen with $\frac{3}{4}$-in. meshes, and thoroughly washed with clean water. Unless the washing was carefully done, it was found that the concrete "swelled and blew after setting." Three different proportions were adopted, namely (A), 1 part cement to $4\frac{1}{2}$ parts clinker, (B) 1 part cement to 6 parts clinker, and (C) 1 part cement to 6 parts clinker as above, and 2 parts clinker ground to the fineness of coarse sand. The concrete was well rammed into greased wooden moulds. Slabs of three different sizes were made of each mixture, namely, 21 in. × 18 in. × 4 in., 30 in. × 18 in. × 6 in., and 39 in. × 18 in. × 9 in.; they were kept dry until tested. The supports for the different-sized slabs were 12, 18, and 27 in. apart respectively.

If we base our calculations on the formula, $W=\frac{2}{3}\,C\,\frac{BD^2}{L}$ (where W and C are in cwts., and B, D, and L in inches), we can find the value of C for the different mixtures. For concrete (A)—proportion 1 to $4\frac{1}{2}$—C=1·9* at the age of fifteen days, and 2·8* at the age of twenty-one days; for concrete (B)—proportion 1 to 6—C=1·2* at the age of fourteen days, and only 1·1† at the age of twenty-one days; for concrete (C)—proportion 1 to 8—C=0·3‡ at the age of fourteen days, and 0·4* at the age of twenty-one days.

The individual beams in the two last series vary considerably, some being twice as strong as others, and, as the total number of "slabs" of these series was only 15, of which four were damaged prior to testing, the "constants" deduced are not very reliable. Indeed, all the tests were carried out at too early dates. The single beam of the 8 to 1 concrete, which was tested at the age of fourteen days, was "not dry through," and consequently not in a fit state for being broken. In the other cases also, more uniform and more valuable results would have been obtained if the beams had been a little older. But the tests will have the effect of drawing further attention to the importance of keeping the supports of concrete floors in position for as many weeks as possible, more especially when the proportion of cement to aggregate is small. They also corroborate previous experiments, which have shown the unsuitability of concrete, when used alone, for resisting transverse stresses; for the beams tested by Mr. Lowcock yielded suddenly and totally, no sign of fracture, except in one instance, appearing before the collapse.

It must be borne in mind, however, that the beams were merely *supported* at the ends. Had they been *fixed*, the probability is that the lower surfaces would have cracked long before the beams actually collapsed. In other words, the concrete would have formed itself into a kind of arch, part of it opposing a compressive resistance to the stress of the load, and part of it (underneath) being at the same time cracked, and consequently worse than useless. It is this behaviour of fixed concrete beams and slabs which renders it impossible to calculate their strengths from constants deduced from experiments on beams and slabs which have been merely supported. We hope that the next gentleman who tests concrete beams and slabs will see to it that some of them have their ends and edges securely fixed. In this way only can a rule be formulated which shall foretell the strength of other beams and slabs with an approximation to accuracy.

On the whole, Mr. Lowcock's tests give somewhat low results, but this is due to the early dates at which the tests were made, and, perhaps, partly to the nature of the aggregate. A beam, composed of equal volumes of Portland cement and coke breeze, and tested in 1891 by Mr. David Kirkaldy, yielded a constant of 5·9, although the beam was only seven days old; while a much larger beam, composed of one part Portland cement and four parts clean breeze, and tested by Colonel Crozier, yielded a constant of no less than 4·1, but the age of the beam was forty-three days. As the strength of Portland cement varies pretty nearly as the cube root of its age (within reasonable limits, of course), a beam similar to that tested by Colonel Crozier might be expected to furnish a constant of 3·3 at the age of twenty-one days, or 17 per cent. in excess of the average obtained by Mr. Lowcock for beams of slightly inferior composition, but only 6 per cent. in excess of the strongest beam of similar composition tested by him. The twenty-one days' tests of the $4\frac{1}{2}$ to 1 concrete are therefore remarkably similar to Colonel Crozier's test, but the results of the experiments on the two weakest concretes are not sufficiently regular to be of much use. This really does not matter much, as coke-breeze concrete weaker than 1 to 4 or 5 is seldom used where it will be subject to transverse stress.

It may be added that the weight per cubic foot of the $4\frac{1}{2}$ to 1 concrete was 118 lbs., and the compressive strength, at the age of fifteen days, was 1,120 lbs. per square inch.

In the same volume of *Proceedings* four papers on graving-docks are printed, together with the discussion and correspondence which followed the reading of the papers. Some interesting information on concrete is given, but to this we merely allude in passing. A few words of Sir Benjamin Baker on theoretical investigations of strength may, however, be quoted, as they have a special significance when spoken by an engineer who must have had recourse very largely to such investigations. After referring to the strength of concrete beams, he said:—"Bearing upon the general question of the value of theoretical investigations of strength, in cases such as a flat concrete invert, as compared with direct practical experience, I may say that several cases recently have made me a little nervous as to whether the results of the high technical training of the present day with many young engineers do not lead to a dangerous confidence in theoretical deductions and the use of formulas. No one can charge me with contempt of theory; but cases have been brought under my notice rather frequently of late, showing too great confidence on the part of young engineers in theoretical deductions; in preference to going to the same extent as their predecessors had been in the habit of doing to previous examples, in order to see what was the right proportion to adopt in a particular work." And again, "Theoretical knowledge is no substitute for the practical experience upon which our predecessors in this Institution have chiefly relied."

Certainly it sounds somewhat strange to hear a master of theoretical investigations (for the designer of the Forth Bridge cannot have been otherwise) discounting such investigations in this way, but there can be no doubt that his words are words of wisdom, and are especially to be pondered in connexion with calculations of the strength of concrete beams. For the ordinary rules, which give the strength of fixed beams as double that of beams simply supported at the ends, do not apply to concrete. Fixing the ends of a concrete beam may treble or even quadruple its strength, while, instead of yielding without previous fracture, the underside of such a beam may crack long before the upper surface yields. From this it is clear that a concrete beam with fixed ends is, to all intents and purposes, an arch, and theory has not yet, on account of the paucity of experiments, formulated a rule for calculating the strength of such an arch.

Sir Benjamin, however, does not contemn theory; he would merely have it conformable to right practice, as it ought to be.

NOTES.

IN a letter which we publish in another column, Mr. Leonard Stokes, in reference to our comment on Lord Coleridge's utterance in a recent case, raises a protest against the system of 5 per cent. charging by architects. We have always held, and have more than once expressed, the opinion that the system is a radically bad and illogical one, and agree with all the reasons given for this opinion in Mr. Stokes's letter, except so far as this—that we do not see that the architect ought to be considered as laying himself open to the imputation of increasing the cost of a building in order to keep up his fees. Architects are no more open to such a charge than doctors or

* See the *Builder* for December 17, 1892, page 482.

* Average of three tests.
† Average of two tests.
‡ One test only.

lawyers. A physician who charges a guinea for each visit is under just the same inducement to multiply his visits and to keep a case running on as long as he can. A barrister who is paid, in addition to his retaining fee, in proportion to the number of days he has to attend in court in the conduct of a case, is in the same position. But the charge of endeavouring to lengthen out the case or the proceedings in order to increase his fees is very rarely made against a physician or a barrister, and in fact the mere making it would generally expose a man to obloquy and to the charge of want of knowledge of the world. Why is it to be supposed that there is any more fairness and reason in making such an odious charge against the architectural profession? As far as the Institute is concerned it appears to us that as long as the majority of architects are content to accept the percentage system of charging, the Institute, which is the representative body of the profession, is almost bound to set up a standard for the guidance and support of its members. They would have a right to complain if it omitted to do so. If a majority, or even a considerable minority, of members of the Institute, would agree to memorialise the Council in favour of the abolition of the percentage system, it would then be the manifest duty of the Institute to reconsider the question. That is the direction in which Mr. Stokes had better move, if he wishes to accomplish a reform. The question, however, has little bearing on the peculiar views of learned judges on this point. If an architect, resolving to abandon the percentage system, had informed his client that his fee for designing and superintending a certain building would be 1,000*l.*, and if the building project were abandoned after the plans and designs were fully made out, he would then be fairly entitled to charge at least half the stated fee, 500*l.* But he would be told all the same by Lord Coleridge that he was not entitled to it, because he was to be paid to produce a building, and had not done so. The most powerful argument against the percentage system is that mentioned by Mr. Stokes, that it reduces all architects, whatever their abilities, to the same level, and obliges an architect of exceptional powers to multiply his works beyond what he can properly attend to himself, in order to reap any advantage from his special ability; whereas if he charged in proportion to the value set on his work, he could make the same income by giving his full attention to a limited number of buildings. That consideration alone is sufficient to condemn the percentage system, though that is perhaps the only really grave and serious objection to it.

AFTER a long pause the German Archæological Institute has issued another instalment of the *Antike Denkmäler*—forming the first number of the second volume. It contains a publication of special interest to architects, *i.e.*, that of the new drawings and plans of the so-called "Tholos" at Epidaurus, by the German architect, Herr Herold. The general structure of this most curious building is well known from the preliminary publication in the Athenian Πρακτικὰ of 1882, but the discovery since then of the inscription, with the building accounts of the Tholos, has made it possible to attempt a much fuller restoration. Moreover, it has given us the real name of the building, which though in its purpose substantially the same as the Tholos at Athens, was actually known as the Thymele. The full discussion of the inscription in relation to the extant ground-plan and fragments, Dr. Dörpfeld reserves for the next number of the *Jahrbuch*, but he appends to Herr Herold's plans and restorations a brief explanatory text. The structure was, as its name implies, an altar-building. The entrance lay on the east side directly facing the great altar, the remains of which have been found to the south of the temple of Asklepios. The building consists of six concentric walls, the actual and restored state of the foundation of which Herr Thorold gives together as one plate. The three outer ones are of substantial breadth, the three inner ones remarkably thin. The three inner ones form a curious labyrinth, the doors in them being broken at each place, and little partition walls so intercepting that a person entering the periphery must traverse the whole to penetrate to the centre. The purport of this must, it seems, have been a ritual one, but it remains wholly unexplained. The outer colonnade is of porous limestone, and the Doric columns that compose it are, from the shape of their echinus, clearly younger than the Parthenon, the architrave being in form and proportion that in use in the fourth century B.C., but with this peculiarity that the metopes are decorated with richly sculptured rosettes. The inner colonnade was of the Corinthian order, and of extraordinary beauty.

L'ARCHITECTURE for July 8 publishes a letter from M. Harmand, advocate in the Court of Appeal at Paris, to the President of the Société Centrale des Architectes, on the subject of the copyright of architects in their works. The tendency of the letter is in favour of recognising the right of the architect in his design. M. Harmand does not see why he should be considered in any different position from an author in literature, who has an absolute right to prevent any one appropriating or publishing his work. M. Harmand does not confine his view to the mere drawings of the architect; he says the architect can affix his signature to his work, whether it be the drawings or the executed building. He admits that there is nothing to prevent the proprietor from altering and even spoiling the building, without the intervention of the architect, but argues that in that case the architect should have the right to demand the suppression of his signature, if the alterations made in the building appear to him at variance with his conception. This, however, is rather cold comfort. On the other hand M. Harmand is careful, he says, to confine the copyright of the architect strictly to those buildings "ayant un caractère original et un mérite artistique." Exactly; but who is to define that, or to draw the line between buildings which have and buildings which have not sufficient artistic merit to constitute a claim to copyright? We can fancy the bewilderment of judges, counsel, and jury, if such a case came to be argued in an English court of law! Whether it would have more chance of solution in a French court we cannot say. On the whole, we fear, M. Harmand's opinion, though of interest, is not calculated to alter our conviction that the copyright in an architect's executed buildings will be difficult if not impossible to establish by law.

THE appearance of Herr Ohnefalsch-Richter's "Kypros, the Bible and Homer" cannot pass unnoted, but it is a book that would have been full of disappointments had anyone ventured much hope. Heralded by a *facsimile* letter of the most non-committal kind from Mr. Gladstone, dedicated to a princely patron, it is big with all that advertisement may furnish, and barren of nearly every quality a scholar prizes. The vast material has never been arranged, much less sifted; theory everywhere is of the crudest, and whole pages are devoted to the details of personal squabbles and the elaborate vindication of unimportant personal priority. Mr. Ohnefalsch-Richter seems to have been ill-used by nearly every archæologist of distinction, a fact or fancy enough in itself to give us pause. What remains of permanent value in a chaos which we scarcely like to call a book is in the main the observation, always alert and intelligent, of modern Cypriote customs. Much more of this would have been welcome; it is a field as yet little worked. The careful severance too of objects found in distinct tombs, and the description of the lie of their discovery is a good trait. If Dr. Richter had contented himself with excavating, and got some educated man to write his book, we should have owed him a double debt.

EVERY archæologist — and especially those who have not been able recently to visit Greece—will be grateful to Mr. Cabbadias for giving us the first livraison of his "Fouilles de Lycosura." The prototype plates contain the three great heads of Demeter, Artemis, and the mythologically problematic Anytos, as well as a piece of the remarkable embroidered ritual robe. The colossal size of the torsos discovered has so far prevented their being brought to Athens, and the restoration, and, of course, complete discussion of the figures cannot as yet be attempted. When this is done, we may hope to have before us not only a fairly complete work by the great sculptor Damophon, but also what is, perhaps, more important, we shall have an authentic picture of a great *cultus* group. Meanwhile, it is a great thing to have the heads accessible. In the text Mr. Cabbadias gives a description of other important fragments discovered, and also a plan of the Lycosura temple.

THE Congress of the Royal Archæological Institute, which is being held this year in London, began on Tuesday. The day was occupied by visits to St. Bartholomew's the Great, Smithfield, and to the Charterhouse. In the evening a reception of the members took place in the Guildhall Museum and Library, on the invitation of the Library Committee of the Corporation of London, a large number of ladies and gentlemen of literary, scientific, and artistic pursuits having been invited to meet them. The fine suite of rooms is well adapted for meetings of this description, and the aspect of the museum and galleries, brilliantly lighted and filled with guests, was admirable. The reception took place in the library, where, at eight o'clock, Mr. A. A. Wood, Chairman of the Library Committee, supported by leading members of the City Corporation, welcomed the numerous guests. Apart from the usual objects contained in the museum—a collection of which the City, once so negligent of its antiquities, may now well be proud—many other exhibits were on view, either specially for the evening, or temporarily. Among these, a beautiful series of Tanagra figures, lent by Mr. W. Rome, F.S.A., were much admired. A capital collection of books of early date, printed in London, were on view in the Library, where were arranged examples from the presses of Caxton, Wynkyn de Worde, Pynson, John Day, &c. These were lent by Mr. Heath, F.S.A., the President and Governors of Sion College, Messrs. Bernard Quaritch, Talbot, B. Reed, and others, as well as from the Library itself. We noticed, too, some of the manuscripts from the Library, and many of the City Charters from the Corporation archives. The care with which these documents are kept, by the way, affords a great contrast to the careless manner in which some other City records are kept. Mr. Philip Norman's views of Old London are always of interest, and the examples exhibited, although far from being the best examples of our few remaining old houses, yet are of value, and indicate that even the least interesting ones have their depictor. In the Reading Room a good exhibition of manuscripts and letters, with early editions of the works of Shelley, were on view, and were worthy of more attention than perhaps could be rendered to them when so many other objects were on view. The committee did well to arrange in the library a series of books of views of the London antiquities that have passed away. They were examined with interest by the guests. The Archæological Section of the Institute's meeting was held in the

picture gallery at 9 o'clock. The ancient crypt of the Guildhall, which was to have been thrown open for inspection, was unfortunately obliged to be closed, owing, we believe, to a difficulty with the lighting.

AS stated on another page, the Public Health and Housing Committee of the London County Council, in response to a communication from the Local Government Board, has reported in favour of an alteration in the insanitary and improper "Regulation No. 21," made by the water companies under the Metropolis Water Act, whereby the companies restrict the waste-preventing cistern of water-closets to a discharge of two gallons. This discharge, in cases that have come within our knowledge, has been found actually inadequate to cleanse the pan, with the further danger of insufficient volume of water to ensure carriage to sewer. Added to this, the cisterns sanctioned by some of the London water companies are constructed so that it takes about ten minutes to fill them again, so that any additional flushing at the moment is rendered impossible. It is really difficult to understand by what ignorance or negligence the water-companies have ever been allowed the power of making a restriction so dangerous to the sanitary condition of London, and one which in many instances, we have reason to think, has been illegally but quite rightly ignored. It is monstrous that water companies should ever have been allowed to take such means of checking the expenditure of water. The London County Council has now definitely recommended that the limit of restriction should be altered to a three-gallon flush, and that regulation 21 under the Metropolis Water Act be amended accordingly. We doubt if the limit ought not to be higher than three gallons; but as the Local Government Board are obviously in favour of the alteration, we presume we shall at least get that.

MR. KEKEWICH, the Secretary to the Educational Department, at the opening of some new Board Schools at Brighton a few days ago, made some salutary remarks on the sanitary state of Elementary Schools. Mr. Kekewich is in reality the permanent Minister for Education, and is really more responsible for the working of that department than the political Minister, who changes with each Administration, and who can do little more than attend to the business of the department in the House of Commons, and direct the larger matters of policy. Mr. Kekewich urges strongly the necessity of having elementary schools in a thorough sanitary state, and impresses upon managers that this is one of their first duties. It is quite certain, therefore, that the Education Department will keep a watchful eye on the sanitary state of schools under their charge, and managers who neglect their duty in this respect may expect very little mercy. Apart from the important effect upon the health of children of a wholesome school, attention to this matter has an indirect effect of much value. For it draws local attention to the subject; and it causes the rising generation to acquire some knowledge of proper sanitary states. Children who are accustomed in school to decent sanitary appliances will, as they grow older, look for them in their homes.

MR. JUSTICE BRUCE has recently delivered a considered judgment which is of some importance to persons who purchase building plots. The case was that of Blake *v.* Marriage, and it raised a question on the construction of a covenant in a deed by which the defendant bound himself not to erect on a plot of land anything except private dwelling houses. The rest of the covenant was of the usual character, laying down conditions as to the size of the houses and so forth. The defendant erected a stable on the land and used it for a time for the horses and carts which he employed in his trade of a builder. He stated in evidence, however, that he intended to build a dwelling-house, and that the stable in question was suitable for such a house. The judge held that it was no breach of the covenant to build a stable before a dwelling-house, but to use it, as was done in the case, was a breach, and for this he gave damages to the amount of 15*l.* The decision is a satisfactory one; it would be hard on a person who really intends to build a dwelling-house if he might not build a stable first if it was convenient. But to allow such stable to be used for trade purposes when no house was yet erected would clearly be to allow the land to be used for purposes for which it was not intended, possibly for an indefinite time.

THE annual report of the condition of the borough of West Hartlepool, drawn up by Mr. J. W. Brown, Borough Surveyor, is very well and completely done, and numerous tables of statistics give very full information on various heads. The death rate (16·80) is below the average of the last nine years, although the population has increased; an indication that the sanitary state of the town is being well attended to. More than 5,000 yards of new front streets have been "declared" in the year, and 2,214 yards of back streets. The past winter "has been a trying one for macadamised roads," but we do not agree with the Surveyor in recommending the introduction of wood pavement on that account. In regard to the clearance of snow, it is suggested that if the various owners of houses would assist in this the first thing in the morning, the work would be much facilitated and the footpaths more comfortable to walk upon. This is what used to be the wholesome rule in London, which our municipal rulers have foolishly given up; with the natural consequences. The Council applied for and obtained a loan of 6,000*l.* during the year for the work required to be done in repairing a great extent of old and deteriorated footpaths; the work on these is in progress. We learn that a great improvement in the state of the sewers has been brought about by the regular employment of two flushing vans. During the cholera scare, large quantities of carbolic acid were used in the flushing vans to aid in purifying the sewers.

IT must be admitted that London came out well on the day of the royal wedding. The line of route of the procession was decorated with an unstinting hand, especially the route to the City, and with very good taste. The red Venetian masts with highly coloured artificial garlands festooned from one to another for miles, and the flags and mottoes hung everywhere across the street, combined to produce that effect of profusion which is such an invaluable element in festal decoration, and which is often more telling than the best and most carefully designed decoration carried out in a more restrained style. Walking along the track of the procession eastward, along Fleet-street and Ludgate-hill, it was difficult to believe oneself in London, so completely had the usually rather dingy aspect of these streets been masked and disguised. From half way along Fleet-street, where the road begins to slope, the appearance of the opposite slope of Ludgate-hill, a mass of moving heads and garlands and waving flags, with St. Paul's rising in the rear, suggested a festive scene out of a grand opera. St. James's-street, with its columns at the ends of the street and its net-work of garlands crossing from side to side, giving the whole street the appearance of a bower, was even better as a foreground effect, but wanted the glory of the long vista which was so effective from Fleet-street. Westward of this, Piccadilly depended more on the decoration of individual houses than on any general scheme of street decoration, and masts had not been set up, probably from a perception that this kind of decoration demands houses on both sides of the street as a background and support. Some of the houses were very well decorated; but none of them came up in this respect to the Albemarle Hotel, which, as being the corner house nearly facing St. James's-street, was probably felt by its owner to call for some unusual efforts. The effect of the house, draped and festooned by stuffs in very light tints of pink, white, and blue, was admirable; it was by far the best individual effort at decoration which we observed anywhere, and does great credit to the taste and ingenuity of Messrs. V. & G. Jetley, who, we understand, carried it out.

THE NATIONAL WORKMEN'S EXHIBITION.

ALTHOUGH the title of the exhibition of craftsmanship opened by the Prince of Wales in the Agricultural Hall, Islington, on the 1st inst., is somewhat ambitious (as such titles generally are), the "National Workmen's Exhibition of British Skilled Industries" is, on the whole, the best exhibition promoted by working men which we have ever seen. There is an almost entire absence of the amateurish exhibits—many of them fearful and wonderful examples of perverted ingenuity and patience—which we remember to have seen in former workmen's exhibitions. The present is a genuine exhibition of *bonâ-fide* trade work done by full-fledged craftsmen or by apprentices in the trades represented. The exhibitors hail from all parts of England, and also from Scotland and Ireland, and this fact, we suppose, must be taken to justify the use of the word "national." A "national" exhibition in the true sense it is not, either in point of extent or variety, but it may be taken as a fairly representative show, containing a great deal worth seeing, which is very much more than we have been able to say about a great many recent "exhibitions" held in the same building within the last few years.

The Exhibition has been promoted by the London Trades' Council, of which Mr. George Shipton is Secretary. He is also acting as Manager and Hon. Secretary of the Exhibition. The Exhibition Committee consists of some fourteen prominent members of leading trade unions, those representing the building trades being Mr. Gregory (Stonemasons), Mr. H. R. Taylor (Bricklayers), and Mr. Shipton himself (Decorators). The Committee have been fortunate in securing substantial financial support from the Corporation of London and from several of the leading City guilds, and a representative Prize Fund Committee has been formed. Very many of the exhibits are shown direct by the workmen themselves, under their own names, and in most of the collective exhibits sent by firms of employers, the names of the workmen are appended. For example, Messrs. W. & F. Thorn, Messrs. Thrupp & Maberley, and other well-known carriage-builders, exhibit carriages of various kinds, and it will be news to a great many people to find that the production of a brougham (let us say) involves the employment by the master "carriage-builder" of men following some nine or ten practically distinct trades, viz., body-maker, carriage-maker, carver, smith, viceman, spring-maker, trimmer, painter, wheeler, and lamp-maker.

The contents of the Exhibition are arranged in fourteen groups, as follows:—I., the Building Trades; II., Silver Trades, Goldsmiths, Jewellers, &c.; III., Printing and Allied Trades; IV., Leather Trades; V., Clothing Trades; VI., Engineering and Metal Trades; VII., Milling and Baking; VIII., Furnishing, Brush, and Basket Trades; IX., Shipping, &c.; X., Tobacco Trades; XI., Glass and Pottery Trades; XII., Coachmakers, Wheelwrights, &c.; XIII., Textile Trades; XIV., Women's Industries. There is also an interesting collection of exhibits from Woolwich Arsenal and Dockyard.

Group I., the Building Trades, is stronger in plumbers' work than in any other craft. This is no doubt largely due to the impetus given to the technical education of plumbers of late years by the efforts of the Plumbers' Company, under the Mastership of Mr. George Shaw and the present Lord Mayor of London, Alderman (now Sir) Stuart Knill. Although the exhibits of plumbers' work are, on the whole highly creditable, some of the specimens are evidently mere *tours de force*, and not examples of things likely to come within the

range of practical plumbing; they are, indeed, only likely to put the young workman on the wrong track, and are eminently calculated to foster a belief in the minds of people at large that plumbing-work is necessarily complicated. If we see many more of such exhibits we shall begin to share the doubts which we heard expressed by a well-known master builder two or three months ago as to the results of the movement for the technical education of plumbers. We say nothing against the workmanship of these particular exhibits, which as far as we could examine it, appears to be very satisfactory; we merely deem it advisable to protest against the unnecessary and delusive intricacy which characterises them. These remarks, however, are not applicable to the general run of plumbing exhibits, which include a great deal of practical work based on sound principles. In bricklayers' work there has been erected on the floor of the hall a gauged brickwork doorway, the joint work of six members of the Operative Bricklayers' Society. This doorway has been designed by Mr. J. T. Lawrence, architect, and is carried out in the Bracknell red bricks of Messrs. Lawrence & Sons. Another good piece of brickwork is the upper portion of a niche in gauged-work, executed by Mr. C. C. Dilley, of Battersea—a student of the Westminster Technical Institute. There are other specimens of brickwork, and a few examples of plasterers' work. Mr. E. Robbins, one of the exhibitors in this section, suggests that something more should be done than is now the case in promoting good plaster-work, and he hints at the formation of technical classes for apprentices and young workmen in the trade. Perhaps the City guilds which are most closely connected with the craft will see to this. In the section devoted to carpenters' work there is nothing very striking, although one or two exhibitors, notably Mr. J. T. Rees, show some good staircase-work. Several forms of safety window-sashes are shown, and Mills's portable election fittings are well worthy of the attention of returning officers and other officials who have to make arrangements for voting by ballot in Parliamentary, County Council, and School Board elections. Masons' work is very poorly represented.

Group II., devoted to the silver trades, goldsmiths, jewellers, &c., is fairly well represented; but the chief attraction is a loan collection, sent by Her Majesty the Queen, of examples of gold and silversmiths' workmanship. These are exhibited in the room known as Berners' Hall, where due provisions for their safe custody are made. The principal object of this collection is the "Military Trophy," in the form of a large centre-piece, the work of Mr. Alfred Gilbert, R.A., who is stated in the catalogue to have been engaged three years upon it. It was a Jubilee gift to the Queen by the officers of the British military forces.

Group III., the Printing and Allied Trades, is rather a large one, and the exhibitors include some well-known firms of printers and lithographers. Chromo-lithography is well represented, and the various processes are very well illustrated. The National Society of Lithographic Artists and Designers exhibit an historical loan collection of designs and reproductions, and they also show what they call an "ideal hoarding," by way of a suggestion for street advertising. The hoarding practically consists in appearance of a dado some 9 ft. or 10 ft. high, with a papered ground of a darkish hue, surmounted by a plainly stencilled border. To the hoarding thus prepared the pictorial and other posters are affixed, with margins of from 18 in. to 2 ft. all round them. By this system of "hanging," a better and less confusing effect is produced than by putting the posters close up to each other, but the effect of the arrangement is largely dependent upon the character of the posters themselves; if these be inherently vulgar and bad in design, the arrangement proposed for them will only accentuate their vulgarity. Paper-hangings are placed in this Group, and not in Group I., and Messrs. Jeffrey & Co. have a very good show of their productions. In the same group is included bookbinders' work, and in this section, amidst much that is commonplace, we must make honourable exception of the exhibit of Messrs. W. T. Morrell & Co., which includes some admirable specimens of delicately-tooled and finished bindings, with the names of the workmen appended to the specimens.

Group IV. is mostly monopolised by the boot and shoe trades. Of this and the other groups named, it is not necessary for us to say anything, except that in Group XIII., Textile Trades, Messrs. Liberty & Co. have a very good display of Spitalfields brocades. In Group XIV., Women's Industries, the most notable exhibit is the copy of the Bayeux tapestry made by the Leek School of Needlework under the superintendence of Mrs. Wardle. Useful guide-books affording a key to the incidents represented by the tapestry are provided for the information of visitors. This exhibit, we may add, is upstairs in the gallery at the Islington Green end of the Hall. These capacious galleries, let us add, are well filled with exhibits, and their present condition is a pleasing contrast to the dreary and forsaken aspect which they wear during most other exhibitions held in the building.

The Exhibition, we understand, is to remain open until Saturday, August 12.

ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY.

As already reported,* the Royal Commission finally concluded its inquiry by examining Dr. F. W. Barry, one of the Inspectors of the Local Government Board, upon his official reports attributing epidemics of enteric fever in Stockton and Middlesbrough and other places in the Tees Valley to the flood water of the Tees, having previously examined Mr. Wilson, the manager of the Water Board, who impeached Dr. Barry's conclusions, and attributed the fever to local insanitary conditions. Dr. Barry stated that this was one of the first cases in which the alleged conveyance of enteric fever on a large scale by a filtered water supply had been made the subject of exhaustive investigation; and, as the reports were adverse to the water supply or the filtration, the case had a direct bearing on the main problem before the Commission. It is impossible to state concisely the topographical and statistical elements of the controversy between Dr. Barry and Mr. Wilson, which was opened for the public by Mr. Wilson's defence of the water, and closed by the rejoinder of Dr. Barry, whose final report is still unpublished. The broad facts of the case are that the flood water of the Tees is exceptionally polluted, that it rapidly fouls the filters, that it is probably filtered imperfectly, as bacteriological examination indicates, that it is distributed in localities where insanitary conditions prevail; and, in epidemics of fever, drinkers of Tees water suffered more than others. In these circumstances, all concerned in questions of water supply will read with interest a summary of the evidence of

Dr. Barry on the Tees Epidemics.

Dr. Barry had been one of the inspectors of the Local Government Board for more than ten years. He was constantly making inquiries, but he had not previously made any on so large a scale as this as regards enteric fever. He regarded his report as establishing the strongest possible presumption, short of absolute proof (complete demonstration being hardly to be looked for in the present state of our knowledge) that the Tees water was the cause of the exceptional prevalence of, and mortality from, enteric fever. Mr. Wilson claimed to have shown that, whatever was the cause of the epidemic, it was not Tees water; but he had done nothing of the kind. His contentions were based on evidence of the negative class, and for the most part he had touched only the fringe of the great body of facts dealt with in the final report. If the Commission thought the conclusions of the report were invalidated by Mr. Wilson, he asked to be allowed to comment on Mr. Wilson's evidence, and he also asked for some days for marshalling his comments in due order, proportion, and sequence.

The Chairman could not state the conclusion the Commission would come to, because they had carefully avoided considering the subject and they could not hold any further sitting to take evidence, because they were obliged to report before the summer recess. It was the main general conclusions they would chiefly consider, and they could not investigate whether this or that case of fever was due to this or that cause.

Dr. Barry made some corrections in the proof of his final report, which the Commission had. In his interim report he had said the exceptional incidence of attack had been almost entirely confined to the users of Tees water, that in the larger districts the house attack rates were almost absolutely uniform, and that the rates proved the exceptional prevalence of the disease to have been fairly uniform. For "uniform distribution" he wished to substitute "universality of distribution." The tables showed the rates were not absolutely uniform; it was universality of attack and uniformity of incidence. Later investigations had not changed his opinion, as regarded uniformity of exceptional incidence, but uniformity had been misunderstood as implying mathematical uniformity. There was a nearly uniform excessive incidence of disease. In his inquiry he proceeded by the process of exclusion, dismissing various common agencies for the dissemination of enteric fever. Then he found that in the ten sanitary districts under review, in which an excessive incidence of enteric fever occurred in the two periods of six weeks in question, there did exist a community of circumstances to a large extent as regards water-supply, whereas, in respect of any of the other commonplace conditions, which have been elsewhere convicted of disseminating enteric fever, they differed *inter se* in all variety of ways. Putting aside two or three instances in which the numbers were so small as to give unreliable rates, the subdivision of the districts sufficed to demonstrate the exceptional incidence of enteric fever attack as practically confined to the users of Tees water.

The Chairman: It only amounts to "practically."

Dr. Barry: As I have said, you could not, in the present state of our knowledge, do more than establish a strong presumption.

The Chairman: To attribute an outbreak of typhoid to water it would have to be confined to the users of that water.

Dr. Barry: The exceptional incidence would have to be so confined.

The Chairman: And it would have to be practically simultaneous in its outbreak, and practically uniform amongst the consumers of the water; not mathematically uniform, but nearly uniform?

Dr. Barry: "Nearly uniform" I think one might accept. You could not be certain that large portions of a water area might not escape.

The Chairman: But why, if they drank the water, should they escape?

Dr. Barry: As far as we know, the matter of enteric fever is particulate; it is not diffused equally. Some districts might receive a large quantity; others escape. That has been noticed over and over again.

The Chairman: It comes so much to be a question of degree. I can understand one house escaping, but not 150, or even 100.

Dr. Barry: It is also a question of the amount of poison or the amount of the infective matter. You may have it extremely diffused, and in a waterworks it would be so; but then that is just all the more reason why many houses should escape if there is only a small amount of infective matter.

The Chairman: But if groups of 150 or 50 houses escape, does not that raise a presumption that the cause of the disease has not been uniformly distributed?

Dr. Barry: You cannot have uniformity where you are dealing with a particulate infection.

As far as our knowledge goes, he continued, typhoid is not spread unless there has been a previous case, but the primary case cannot always be found. He could not form any notion how many cases in the Upper Tees valley could furnish a sufficient amount of specific material to do this damage. But in the Caterham case the excreta from one person caused a large outbreak.

The Chairman: Which is the most reliable factor for consideration—the number of cases or the number of deaths?

Dr. Barry: Where you can get the number of attacks they give the most valuable information as to the period of exceptional incidence. It is much more valuable than the mortality, because that follows at a very varying period after the attack. The percentage of deaths to cases varies very much under different circumstances; and in a large epidemic it is less than where you have a few cases.

The Chairman gave the averages for the Metropolis, the London Fever Hospital, and the Metropolitan Asylums Board's Hospitals, and asked whether 18 per cent. would be a fair average.

Dr. Barry put the mortality in epidemics at 10 per cent.

Dr. Ogle: Why is it lower in epidemics?

Dr. Barry: Perhaps more cases of attack are noticed.

The Chairman called attention to tables showing two ratios, one of 12 and one of 35 per cent., and said they raised a presumption that 35 (Tees water districts) was larger than it ought to be, and 12 (non-Tees water districts) was smaller than it ought to be.

Dr. Barry admitted that too many cases might have been returned in one instance and too few in the other; but there was also this disturbing

* See *Builder* for last week and for June 24.

element—residents in non-Tees districts got the water when at business or work.

Discussing other tables, the Chairman invited the witness to break down the impression that the figures of attack as between drinkers and non-drinkers were fallacious.

Dr. Barry admitted that they were so to some extent. There was a large amount of enteric fever outside the Tees districts, but nothing like the amount inside those districts.

Questioned as to the dissemination of disease by Tees water long after the floods, Dr. Barry held that the pollution in the reservoirs would not pass off at once, but would continue to contaminate the supply, as it did at Bangor.

Dealing with the rural sanitary and also the urban districts of Stockton and Darlington, in both of which there is compulsory notification, and separating the districts supplied with Tees water from those not so supplied, Dr. Barry had compiled tables which furnished the following results, in reported cases of typhoid fever, for four different periods :—

Rural Sanitary Districts.

	Tees.		Non-Tees.
Population	8,991	.....	14,422
1. Cases (16 months)	143	.....	19
Ratios per 10,000	159	.....	13
2. Cases (3 months)	80	.....	9
Ratios	89	.....	6
3. Cases (6 weeks) ...	50	.....	6
Ratios	55·6	.....	4·2
4. Cases (6 weeks)...	30	.....	3
Ratios...	33·4	.....	2·1

Urban Districts.

	Tees.		Non-Tees.
Population	59,446	.....	2,646
1. Cases (16 months)	479	.....	8
Ratios per 10,000.	80·5	.....	30·2
2. Cases (3 months).	304	.....	6
Ratios	51	.....	23
3. Cases (6 weeks) ...	203	.....	6
Ratios	34·1	.....	22·7
4. Cases (6 weeks) ...	101	.....	0
Ratio	17	.....	0

The rates would have been lower in the non-Tees districts if the cases known to have been imported from the Tees disticts had been taken out. The two periods of six weeks end respectively on October 18, 1890, and February 7, 1891. A fallacy to be guarded against in dealing with the urban districts is that you have a mingling of people receiving two supplies with access to both. Making every allowance, Dr. Barry said there was a distinct difference between the two sets of districts, although it was not so striking in the urban as in the rural districts. In the Darlington district there were agricultural and other villages, the populations of which were living under the same conditions, and only where the villages were supplied with Tees water was there any epidemic prevalence. He had reported fully upon the sanitary condition, housing, and industries of all the places embraced in the report. Ancient Stockton was not so densely populated as other parts of the town.

To Mr. Mansergh Dr. Barry said that in the Bangor case there was neither subsidence nor filtration. The filter was found to be in a fearful condition, not having been cleaned out for years.

To Professor Dewar Dr. Barry said he had not obtained health statistics of the Tees Valley for non-epidemic periods. In the main the rural population was non-Tees drinking, and there was a mean proportion of about 4 to 1 of deaths in the urban as compared with deaths in the rural districts. It was to to the unusual condition of the river in floods he attributed the outbreaks. Under ordinary conditions the water might be unimpeachable chemically. The filtration was "very much the ordinary filtration"; some places had better filtration. Professor Dewar pointed out that, according to the bacteriological tests embodied in the report, the filtration left in the water about one-eighth or 15 per cent. of the microbes found in unfiltered river water, while in London filtration removed 98 or 99 per cent. Dr. Barry could not explain this, but thought it indicated some anomaly in the filtration. He could hear of no more than two cases of enteric fever early in 1890 above the intakes, and these were at Coniscliffe, half a mile from the intakes; and he would not refer the epidemic to them. One bad flood would be more pernicious than succeeding floods; and floods might be harmless if the specific material of fever was not in the river to be washed down.

Asked whether the presumption that the infection of the water in August was still operative in October was compatible with scientific facts as to the life of the typhoid organism, he replied it was not with regard to the organism as treated in the laboratory, but our knowledge was incomplete, and we did not know whether that organism was really the cause of typhoid fever. If it were proved that one form of organism could not be kept alive under certain conditions of light and air, we did not know that there was not some other form which might convey the disease. He did not suggest where it lived, whether in the pipes or the filters. Whatever it was that caused typhoid fever in this case, there was a strong presumption that it was remaining in the water. It was supposed to be something living, but that was not proved at all.

Professor Dewar asked whether there was any other case in which the water of a river flowing rapidly for seventeen miles, aërated and filtered, had conveyed epidemic disease.

Dr. Barry believed this was the first case on record in which it had been done on a large scale.

Professor Dewar: And if you substantiate this it must be due to the fact that the filtration is not properly conducted?

Dr. Barry: That the organism, whatever it is, can get through the filters.

Professor Dewar: That the filtration must not be properly conducted.

Dr. Barry: That is supposing that by perfect filtration you can stop everything and prevent anything whatever getting through.

Professor Dewar referred to the case of Hamburg, whose water supply when filtered produced no disease, mentioning that Dr. Koch had ordered that it should be treated in the same was as London water, arriving at this conclusion by rigid experiments.

Dr. Barry understood Dr. Koch also to say there would always be cases in which he could not stop all the infective matter, either of cholera or of enteric fever.

Professor Dewar: That, of course, depends upon the efficiency of the filtration and the life of the organism. There are instances of double filtration, so that if the first is not satisfactory you can have a second. If it be substantiated that this case arose from bad water supply in an abnormal condition of the river, it was due to bad filtration?

Dr. Barry: Due to not perfect filtration.

The generally insanitary condition of the Tees area was admitted by Dr. Barry. He did not say that all the fever was due to the water supply; there was a certain amount of fever normally in the district. There had been deaths from enteric fever for years past in all these districts. Having got in, it was quite possible it had spread, owing to insanitary conditions in certain selected areas. Local Government Board Inspectors had condemned the sanitary arrangements of some urban districts, and, if they had visited all, they would have condemned those of nearly every populous place in the area.

With regard to an enquiry which he made in June, 1890, he was supposed to have attributed an epidemic of that year to insanitary conditions because of certain recommendations he made to the local authorities; but he sent a memorandum to the Local Government Board, which had never been published, and this he now read. This set forth that the one conspicuous condition common to the whole of the large infected area was water supply; and he recommended an inspection of the river such as had been made of the River Ure. He remarked: "For the present the unusual prevalence of enteric fever is at an end; but there is the possibility of a recrudescence of it." He mentioned that, for Stockton and Middlesbrough, works were in process of construction at the head of the Tees Valley for the collection of water from a gathering ground practically free from chance of pollution; and they were then (in 1890) expected to be completed in about three years. But Darlington would still draw from the Tees. Practically he attributed the outbreak of 1890 to water; and it was probable that former outbreaks had to be attributed to it. There was an enormous outbreak in 1874-5-6, and a large mortality from typhoid fever in Middlesbrough, probably due to the same cause; but at that time the Local Government Board made no inquiries. No mention was made of water in his suggestions to the authorities of 1890 because of the statement that the new works were being pushed forward, and the Local Government Board thought it inexpedient to frighten people by putting pressure on the Water Board.

Sir G. Bruce: Then you found a good many insanitary conditions in the district?

Dr. Barry: Certainly; I should do anywhere in that part of the country. You could not send me to any district, I think, in the North of England where I should not find a great many insanitary conditions.

The Chairman: Do you think that places which in theory and by examination and enquiry seem to a scientific medical officer to be the most unhealthy are always the most unhealthy in practice?

Dr. Barry: I am afraid that is a question I am not prepared to answer.

The Chairman: That absolutely concludes our inquiry, and we shall do our best to report before separating for the usual autumn holiday.

ARCHITECTURAL ASSOCIATION SUMMER VISITS:

BUSHEY.

ON Saturday last a large number of members of the Architectural Association went to Bushey, attracted by the opportunity of seeing the house which Professor Herkomer, R.A., is building for himself, and which is now approaching completion. Mr. Herkomer met the visitors and conducted them over the works, of which he has himself been both architect and builder, save that the composition of the exterior was designed by Richardson, the American. This, therefore, in its main lines and grouping shows the boldness and picturesqueness for which that famous architect's work is noted. The details, Mr. Herkomer explained, were not worked out by Mr. Richardson, and we look in vain for that peculiar combination of vigour and delicacy, particularly in the carving, which the deceased architect knew so well how to contrast with the ruggedness of texture that he gave to his wall surface. The greater part of the exterior is faced with tufa stone specially brought from Mr. Herkomer's native Bavaria, relief being obtained by a free use of red sandstone. A notable point in the exterior treatment is the small size and great depth of the window openings, due partly, no doubt, to Mr. Richardson's love of wall, and partly to Mr. Herkomer's desire to feel the sense of being indoors when at home in his new house. The studio is, of course, an exception in this respect, being well lighted, not only by large windows, but also by immense skylights.

Internally, the house will show Mr. Herkomer's hereditary love of wood-work; walls and ceilings, as well as floors, are, in nearly every instance, finished with wood, panelled and carved. In the dining-room, American red-wood is largely used, both for beams and panelling of ceiling, and for the walls. In the drawing-room, oak is principally employed. In both of these rooms the wood wainscoting of the walls is to receive, in addition, decorative figure subjects, executed by Mr. Herkomer, in low relief modelling and coloured. The detail and carving of the interior is based upon late German work, and has been largely executed by Mr. Herkomer's father, uncle, and nephew. Wrought metal work, principally in iron and copper, and of elaborate detail, is also occasionally introduced. The panelling of the bedrooms is to be carried out in pine, carved in low relief. The house, when complete, will be unique, and will reflect the versatility, as well as the idiosyncrasy of the owner, to an extent that is almost unparalleled.

After inspecting the elaborate and costly house of the great artist, the members visited the quiet and unpretentious home of one of his pupils, known as Bournemead, designed by Mr. J. M. Brydon, and illustrated in the *Builder* of May 20 last. Red brick and tile and white wood-work, with simple detail, make up the pleasing exterior. Internally there is little beyond what one would usually find in an artistic but modest small house and studio, where money has not been lavishly expended, but thought has not been stinted. A greater contrast than that between the homes of master and pupil could hardly be conceived.

COMPETITIONS.

NEW TECHNICAL SCHOOL FOR BIRMINGHAM.—The plans for the new municipal Technical School for Birmingham have been accepted. In order to assist the Technical Schools Committee in their determination, Mr. J. Murgatroyd, F.R.I.B.A., of Manchester, was called in as assessor, and he has reported in favour of the plans submitted by Messrs. Essex, Nicol, and Goodman, of Newhall-street, Birmingham. Altogether nineteen architects were invited to compete, of whom thirteen sent in designs. A premium of 100*l.* will be awarded to the successful competitors. Messrs. Martin and Chamberlain (No. 11) were awarded the second

premium of 60*l.*, and the third premium of 40*l.* fell to Mr. W. Henman, the architect for the new General Hospital, whilst an extra premium of a similar amount was granted to Mr. Daniel Arkell. The elevation to Suffolk-street of the selected design is in the English Renaissance style. The outer walls are to be built with brick, with pressed facings and terra-cotta dressings, cornices, mullions, and mouldings. The estimates as originally framed were for 40,000*l.*, but the plans prepared by Messrs. Essex, Nicol, and Goodman represent an expenditure of about 8,000*l.* more than this sum. This is exclusive of the cost of technical appliances and plant.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon last at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

Finance: The Issue of New Stock. — The Finance Committee, in their report, stated that in accordance with the resolution of the Council of June 27, tenders in respect of the 1,500,000*l.* Metropolitan Consolidated 2½ per cent. stock, were opened by the Chairman of the Council at the Bank of England on July 4. The tenders amounted to 1,851,270*l.*; they ranged from 93*l.* to the minimum of 89*l.*; persons tendering at 89*l.* 16s. 6d. will receive about 76 per cent. of their tenders, and those above that price in full. The average price realised was 90*l.* 1s. 1d. The amount of cash receivable by the Council in respect of this issue of stock is 1,350,859*l.*

The report was received.

The Water Question.—The General Purposes Committee presented the following report and recommendation :—

"The Special Water Committee have communicated to us a resolution expressing the opinion that the Committee should now be recognised as a standing committee of the Council. As it appears to us that it will always be necessary for the Council to have a committee to consider questions relating to the water supply of London, we think that the Committee appointed for this purpose should be a standing committee. We recommend—

'That the Water Committee, which has hitherto been classed as a special committee, be for the future one of the standing committees of the Council.'"

The recommendation was agreed to.

Later on, the following report and recommendations of the Special Water Committee were presented :—

"*Supply of Water.*—In compliance with the reference made to us, we are considering the steps to be taken by the Council for acquiring the undertakings of the water companies now supplying London, or for providing a new supply. We now have before us an important report by the Chief Engineer on certain areas from which it has been suggested that a considerable quantity of water could be obtained; but before he can express a definite opinion on the practicability of adopting the suggestion it is necessary that he should have the assistance of geological experts in certain investigations which we consider desirable. We accordingly recommend—

'That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, we be authorised to incur an expenditure not exceeding 500*l.* in employing geological experts to assist the Chief Engineer in investigating sources of water supply.'

"*Water Companies' Accounts.*—It seems to us expedient, having regard to the possibility of a decision to purchase the undertakings of the companies, that the Council should be acquainted with the financial affairs of the companies, in order to safegard the interests of the ratepayers should the question of the amount to be paid be referred to arbitration. We have caused the published accounts of one company to be examined by a financial expert, who has made a report thereon, and we are of opinion that the accounts of the remaining seven companies should be similarly dealt with. We therefore recommend—

'That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, we be authorised to incur an expenditure of 250*l.* for the purpose of obtaining a report on the accounts of the London water companies.'"

These recommendations were agreed to, after some discussion.

Paddington Recreation-Ground.—The Parks and Open Spaces Committee presented the following report on this subject :—

"This question originally came before us in the form of an application for the Council to contribute the sum of 50,000*l.* or 60,000*l.*, being the whole purchase money believed to be required for the acquisition of about twenty-five acres adjoining the Paddington Recreation-ground, then in private hands, but for which an Act of Parliament has just been passed vesting it in the Vestry of Paddington, who are not only to acquire but to control and maintain it.

We could not entertain this proposal, as the Council has never contributed the whole of the purchase money for any open space. We were then urged to contribute the purchase money for nearly three acres adjoining the recreation-ground, and from the plans placed before the Council it is apparent that the addition would be valuable.

The whole of the purchase money for the present recreation-ground has been obtained—25,000*l.* from Paddington Vestry, 13,000*l.* from other local bodies, and over 13,000*l.* from private subscribers, including 2,000*l.* and 1,000*l.* generously given by two of the members of the Council.

The Act of Parliament obtained by the Vestry of Paddington provides for the place being open free to the public, with a certain portion reserved for games, for which the various clubs may be asked to pay small annual rents.

The Council has in several instances contributed to open spaces over which the local authority has entire control. The new feature in this case is that the Council is asked to contribute towards the acquisition of an open space, in respect of part of which charges may be made for the playing of cricket and other games.

This is perfectly true, but we would ask the Council to consider the following facts. The recreation-ground now is complete, the additional three acres are suggested as an improvement, and the Act provides that at least four acres, exclusive of roads, shall always be unappropriated. The Vestry further agrees that two of the representatives of the Council for the district shall be on the committee of management.

At the present time only 150 yards of the recreation ground front on a public road. If the proposed addition is made to the ground, over 500 yards will abut on a road 50 ft. in width.

The district of Paddington has few open spaces, and as this place will be available for the public at all times, and four acres will always be unappropriated for games, we have, after much consideration, decided to recommend—

'That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Council do contribute a sum not exceeding 6,000*l.* towards the purchase of the 2 a. 2 r. 17 p. of land adjoining Paddington Recreation Ground, which is under the control of the Vestry of Paddington, for the purpose of adding it to the Recreation Ground, conditionally on the Vestry giving an undertaking in terms to be approved by the Solicitor that two members of the Council representing the division shall be members of the committee of management.'"

An amendment (moved by Mr. Hubbard, and seconded by Colonel Ford), limiting the amount of the Council's contribution to 2,000*l.* was rejected by a large majority, and the recommendation of the Committee was agreed to.

Highgate Archway.—The Highways Committee presented a report respecting the proposed widening of Archway-road, Holloway, and the reconstruction of Highgate Archway. They recommended—

"That powers be sought in the next session of Parliament to enable the Council to widen Archway-road and to reconstruct the Highgate Archway, as shown upon the plan submitted with the report, and providing also that the cost of the work, estimated at 27,000*l.*, shall, after deduction of the sum of 1,000*l.* to be contributed by the Ecclesiastical Commissioners, be borne in equal proportions by the Council, the Middlesex County Council, the Vestry of Islington, and the Hornsey Local Board."

The recommendation was unanimously agreed to.

The Shaftesbury Memorial Fountain.—The Improvements Committee presented the following report :—

"We have to report that the Shaftesbury Memorial Fountain at Piccadilly-circus was unveiled and handed over to the Council by the Duke of Westminster on June 29 last, and that we are making the necessary arrangements for the maintenance and periodical cleansing of the structure. We may add that Mr. Alfred Gilbert, the designer of the fountain, has submitted several suggestions for the improvement of the fountain, and especially for preventing the sprays of water being blown on to the public way. We will report upon these suggestions in due course."

Mr. Beresford Hope asked who was responsible for the design of the winged figure at the top of the fountain? And what did it represent?

Mr. Moss sought to know whether the Memorial Committee or the sculptor would defray the cost of the proposed improvement of the fountain?

Mr. Hollington, the Chairman of the Improvements Committee, said he was quite unable to answer Mr. Beresford Hope's questions. In reply to Mr. Moss, he said that Mr. Alfred Gilbert would make the alterations referred to at his own cost.

The Crossness Sewage Outfall: Liming Station.—The Report of the Main Drainage Committee contained the following :—

"Our attention has been called to the desirableness of making some alterations to the lime-mixing machinery at the Crossness outfall, and the Engineer has suggested that for the mills now in use at the liming station there should be substituted three wash mills or mixing pans similar to those in use at the Barking outfall, but of a smaller size. He has submitted to us a plan showing how these pans can be arranged, and also an offer by Messrs. Clayton, Howlett, & Co., to supply and fix them for the sum of 475*l.* To enable the pans to be used certain alterations to the buildings will also be necessary. These alterations, which are estimated to cost about 475*l.*, could, we think, be carried out by the Works department, and, in the event of the Council agreeing to the suggested arrangement, we will have the plans and specifications prepared and submitted to the Council. The Chemist has also suggested that some stirrers should be placed in the lime-water tanks to provide for the more thorough solution of the lime in the water, and for this purpose it has been proposed that one of Gabbett's patent mixers should be fixed for trial in one of the tanks. This can be obtained complete for the sum of 162*l.* 10s., but in addition to this some expenditure will have to be incurred in erecting it. The Engineer has also laid before us a design for a traversing agitator to be placed in one of the tanks, it being deemed advisable that one only should be erected in the first instance, so that its efficiency may be fully tested before incurring the larger expenditure for the whole seven tanks. We have given the above proposals very careful consideration, and having ourselves inspected the present process of lime mixing at this station we think it very desirable that these alterations should be made. The total cost of the machinery and alterations will probably not exceed 1,500*l.*, and we recommend—

'That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Council do sanction an expenditure of 1,500*l.* for the erection of new machinery, alterations to buildings, and other incidental works at the liming station at the Crossness outfall works.'"

The recommendation was agreed to.

Waterloo Bridge.—The Bridges Committee reported as follows as to the repaving and cleansing of the carriageway of this bridge :—

"We have further considered the question of repaving the carriageway of Waterloo Bridge at the same level as the existing road. With regard to the material to be used, the estimated cost of laying creosoted deal blocks, which would last about six years, is 2,240*l.* The estimated cost of laying Jarrah wood amounts to 3,660*l.*, and this would probably last about ten years. The estimated cost of taking up, re-dressing, and re-laying the granite carriageway, including quarter new stones, is 3,000*l.* This would also last ten years. The use of Jarrah wood is still somewhat in an experimental stage, and, consequently its length of life is uncertain. Seeing, also, that the local authorities have laid creosoted deal blocks on the approaches on both sides of the bridge, we think that under all the circumstances creosoted deal blocks would be the best for the purpose. We recommend—

'(*a*) That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the carriageway of Waterloo Bridge be repaved with creosoted deal blocks at an estimated cost of 2,240*l.*'

We propose, for the periodical washing of the road and parapets of the bridge and the watering of the carriageway in dry weather, that two lines of galvanised iron water service pipes 2 in. in diameter should be laid under the carriageway, connected with ten hydrant chambers to be formed in the footways. These hydrants, if fixed about 280 ft. apart, would enable the road and parapets to be rapidly cleansed and watered. The estimated cost of supplying and laying the service pipes, connecting the same with ten hydrants, and supplying four lengths of hose with a hand-truck for the conveyance of the hose and spanners, is 546*l.* We recommend—

'(*b*) That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, water service pipes, 2 in. in diameter, be laid under the carriage-way of Waterloo Bridge; that ten hydrants be fixed in the footways, and that the necessary hose and appliances be obtained, at a total estimated cost of 546*l.*'

We further recommend—

'(*c*) That the whole of the work be executed by the Council without the intervention of a contractor, and that the specification, drawings, and estimates be referred to the Works Committee for that purpose.'"

Some discussion ensued on recommendations *a* and *b*, it being urged that a wooden pavement to a granite bridge would be incongruous, and, moreover, unnecessary, as there were no houses bordering the bridge, and the prevention of noise was no particular object. If wood paving was to be used, it was asked, why not use Jarrah? On the question of cost of wood paving as compared with granite setts, Mr. Emden asserted that he had the authority of the Surveyor to the Strand District Board of Works for the statement that wood-paving in that district was found to be very much more economical than granite, and he believed that was the experience of Colonel Haywood, the Engineer to the City Commissioners of Sewers.

The recommendations were ultimately agreed to, and the Council having transacted other business (having, in fact, disposed of the whole of the twenty pages of reports on the agenda, as well as of the notices of motion), adjourned at 4.20, an unprecedentedly early hour under such circumstances.

Illustrations.

INTERIOR, GROCERS' HALL.

THIS is a view of the interior of the new Hall for the Grocers' Company, as carried out from the designs of their architect, Mr. H. C. Boyes. The Hall, as will be seen, is Classic in style, and an old precedent is followed in the dividing off of a portion of the end of the room by a screen between the columns, so as to form a vestibule.

The Hall is 96 ft. long, and 42 ft. wide. The panelling is of oak, and the wrought-iron work of the screen is carried out by Mr. Starkie Gardner. Messrs. Cubitt & Co. were the builders.

We are unable to give the plan at present, but may give it in a future number, along with another illustration.

IGHTHAM MOTE, KENT.

WE publish this week some drawings from the pen of Major-General C. E. Luard, illustrating portions of perhaps the most remarkable Mediæval residence in this country. For the following remarks also we are indebted to General Luard, who has had special opportunities of becoming well acquainted with every detail of the ancient house :—

"The Mote lies at the mouth of a narrow and beautifully wooded gorge in the cliff of greensand which forms the north escarpment of the Weald of Kent. The arms of this gorge are in Dinas Dene and in the hamlet of Toyhatch, and down the former flows the little perennial stream which, after passing through a pond (formerly a string of ponds) and under the bowling-green, is discharged into the moat surrounding the house. High grass slopes and terraces flank on either side this acre of velvet, at the north end of which stand two noble cedars, while at the south-west corner of the pond above it a splendid specimen of the silver fir, 112 ft. high and 13 ft. in girth, mourns the loss by lightning of its fellow which stood at the south-east angle of the same pond.

As is the case at Hever and Leeds castles, in the same county, the moat entirely surrounds and washes the walls; but at Ightham Mote the sharp fall of the ground above and below the house produces a far more rapid flow of water than is possible at either of those places, and the suspicion of dampness attaching to a house so situated may be discarded; in fact, the condition of books and papers there amply disproves it.

It has been supposed by many persons that there is an intimate connexion between the name of this house and the moat which surrounds it, but the reason for this assumption appears to be based on insufficient grounds. The De Hauts, who are believed to have been the first owners of the property in the reign of Henry II., were also lords of the district, and the house would probably have been erected on the site of the Wittennage Mote, or place for the periodical meetings of the Council of the District. It is very probable that the name of Mote* was thus derived, for the surrounding of a place of importance with a moat was a common enough circumstance in those times of insecurity, and quite an insufficient cause for nomenclature.

The moat is nearly rectangular and nearly square, averaging 58 yds. by 55 yds. on the outside, with a breadth varying from 16 ft. at the N.E. corner to 32 ft. at the S.E., and varying from 3 to 10 ft. in depth. The nearly quadrangular house which it surrounds has an external uniform length from east to west of 126 ft., with an average width of 113 ft. from north to south, and encloses an open quadrangle or patio 76 ft. by 53 ft. The moat is crossed by three bridges, that on the west (of ragstone in two segmental arches) leading to the main entrance, a massive Tudor double gate with wicket,† the framing being in high relief, moulded and nail-studded, and with linen-roll panels. Over this gateway, and between the first and second floor windows, are carved on a decayed stone panel the arms of the family of Selby, in whose hands the property was held for three centuries. The panel is set in the face of a square three-storied tower of ragstone, topped with stone-dressed brick battlements. The south side of the upper story is also faced with brick, possibly a repair due to weather affecting the stone face on that, the exposed side. There is no actual historical evidence of the date of erection of this tower, and, in fact, when the Royal Archæological Society visited the Mote in 1863, the late Major Luard Selby, an experienced archæologist, admitted in the account which he then read that the dates of erection of the various parts of the house must, to a great extent, be guessed at, as very little historical evidence existed by means of which accurate dates could be assigned. The names of its proprietors for the last seven hundred years or so, and the periods for which they owned the property, are known with a fairly sufficient accuracy, but not so their works.

It is rather too much the case to assume that a house, or a portion of a house, must have been erected at a specific date because the windows or doorways, or some of them, belong to that date; and again, that if a certain window or doorway corresponds to the work of a particular period, it was consequently executed at that period. Such conclusions are very apt to be arrived at without sufficiently considering, in the first place, that stone, especially much of that used for windows, wears out, and has periodically to be renewed; and secondly, that after making every allowance for what is termed fashion, and for the varying humours of men as regards good taste and bad taste, good proportion and bad, there must have been some architects or masons, and more especially Freemasons, in Mediæval times, who would frequently prefer to reproduce old designs rather than have to make new ones or copy those of their own age. The effect of this, in the absence of actual historical record, would be to give an exaggerated antiquity to work so treated, and we are convinced that errors of this kind, which conveniently agree with the prevailing taste, are frequently perpetrated. The case of the Mote, then, is one which has to be treated with extreme care, for architectural irregularities and a want of uniformity, giving, indeed, a peculiarly subtle charm to the whole pile, are its prevailing characteristics.

One test which has been applied for determining the dates of erection or alteration of certain parts of this old house is ingenious, if not very conclusive; it consists in noting the dates on which the property changed hands, the theory being that a new owner is rarely satisfied until he has demolished, altered, or restored parts of his new possession in some particular or other, and occasionally to a very considerable extent. There is something in this, and it is well, therefore, to keep such points in the mind whilst with the eye you survey the work as it stands. We therefore, before proceeding further, give in a tabulated form this chronological information, so far as it is known and for so much as it may be worth, as a key or clue to the dates of the various parts of the house :—

SUMMARY.

Haut or De Haut	302 years
Cawne or Couen	37 ,,
Brackenbury	2 ,,
Clement	23 ,,
Allen	47 ,,
Selby and Luard Selby	298 ,,
Colyer Fergusson	3 ,,
	712 years.

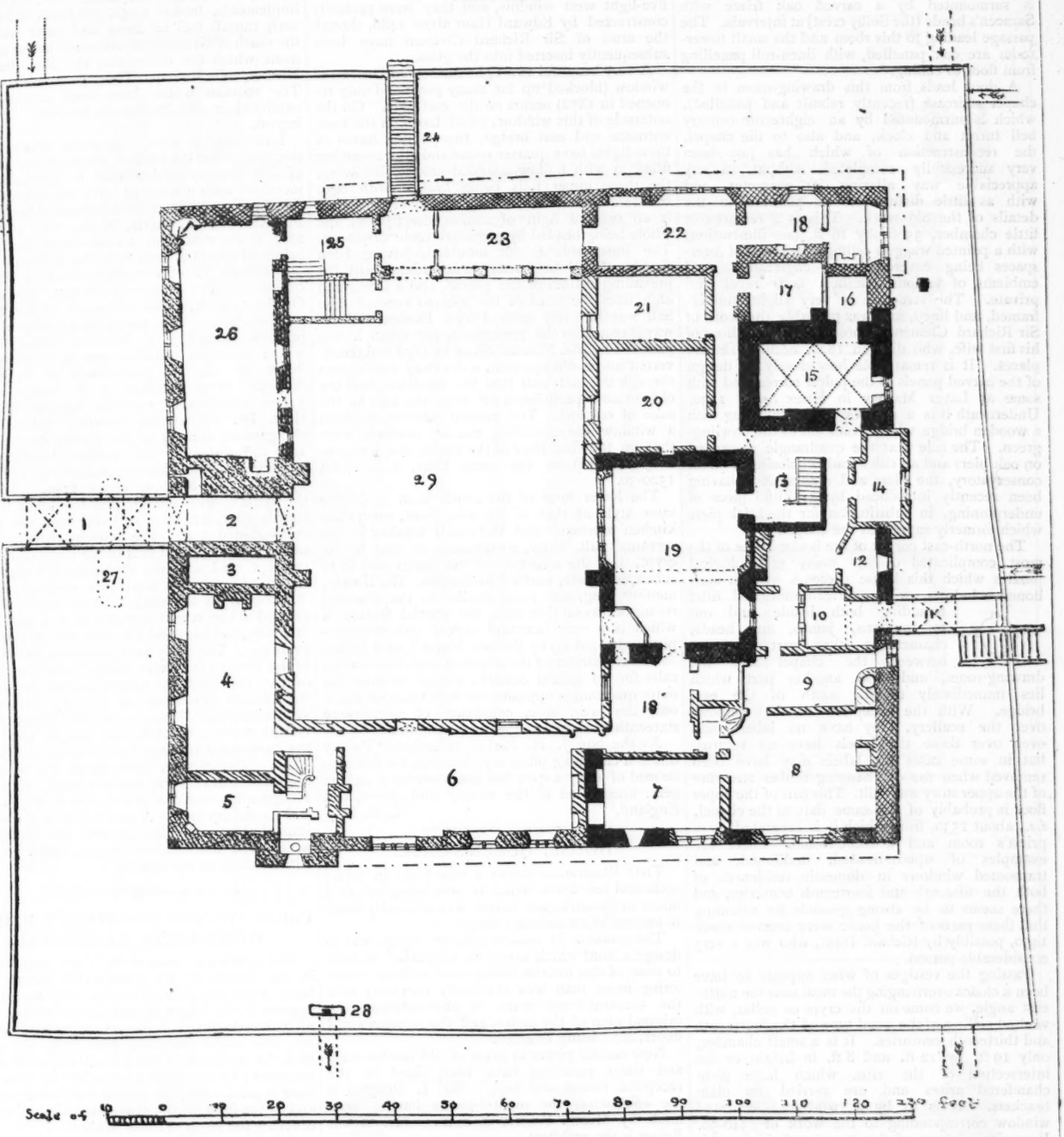
The archway leading into the quadrangle from the west is faced with a perpendicular obtusely-pointed arch, carried on moulded corbels and labelled; it, and the windows above it on both sides of the tower, correspond to the work of the latter part of the fifteenth century. In the glass of one window, that on the first floor of the tower looking towards the quadrangle, the arms of Sir Richard Clement are exhibited, but we cannot accept this as sufficient evidence of his having had much to do with the erection of the tower, more especially as its general character is entirely different from that of the chapel on the north side of the house, which was almost certainly his work about fifty years subsequently. It is a singular fact that this window slightly differs in the trace of the lightheads and in its mouldings from the window above it, and from the windows on the west face of the tower, all of which correspond precisely with, and are apparently by the same hand as, the mullioned window of the hall on the east side of the quadrangle. It is also of a different width and proportion, and does not immediately underlie the window above it. The explanation is probably to be found in the corbelled-out chimney of the room on the second floor of the tower, which has apparently been an afterthought. It is therefore very possible that this chimney and window were subsequently inserted by Sir Richard Clement, who, at the same time, put his coat-of-arms in the window, but that the tower itself was built about 1486 by Edward Haut, who was well favoured by Henry VII. for his father's sacrifices in the Lancastrian cause. It is believed that this king and his queen, to whom Edward Haut's wife (a Woodville or Wydeville) was related, were entertained by him at the Mote. A turret has been added to the top of the tower by the present owner. The remainder of the west side exhibits no work corresponding in character or beauty with that of the tower with the exception of the west window of the drawing-room on the first floor. The windows on that side are (with the above-named exception) all small square-headed two-light windows, with either very obtusely pointed or semi-arched heads to the lights, and they have no labels. The lower story (except the north wall of this front) would appear to have been built or rebuilt at the same time as the tower, whilst the upper floor was not improbably added or reconstructed by Sir William Selby about 1592, which may account for the presence of his coat-of-arms on the face of the Tower. It is probable, however, that the drawing-room at the

Family.	Name of Owner.	Date.	Reign.	Remarks.
De Haut	Ivo or Sir Ivo	*c.* 1180	Henry II.	—
,,	Sir Piers (Fitz Haut)	*c.* 1240	Henry III.	Steward of the King's Household.
Cawne or Couen	Sir Thomas	*c.* 1340	Edward III.	Buried at Ightham, and supposed to be the builder of the hall at The Mote.
,, ,,	Robert	*c.* 1374	,,	—
De Haut	Henry	*c.* 1377	Richard II.	High Sheriff of Kent in 1371 (?)
,,	Richard	*c.* 1450	Edward IV.	High Sheriff of Kent in 1478 and 1482. Beheaded in 1484 at Pontefract, and estate confiscated.
Brackenbury	Sir Robert	1483–4	Richard III.	Governor of the Tower of London, and killed at battle of Bosworth.
Haut	Edward	1485	Henry VII.	Estate restored by Henry VII.
Clement	Sir Richard	1521	Henry VIII.	Bought the estate and built the chapel.
,,	Sir John	*c.* 1532	,,	—
Pakenham	Hugh	*c.* 1544	,,	Married a Clement heiress, and sold the estate.
Allen	Sir John	1544	,,	Bought the estate: he was a wealthy London merchant.
,,	Sir Christopher	*c.* 1559	Elizabeth	—
,,	Charles	*c.* 1580	,,	Sold the estate.
Selby	Sir William	1591	,,	Mayor of Berwick, and knighted by King James at Berwick in 1603.
,,	Sir William (nephew to the last) and others	1611 to	James I. to	Husband of Dame Dorothy, who revealed the Gunpowder Plot to Lord Monteagle. She and her husband and uncle are buried at Ightham.
Luard Selby	Lewes Marianne	1868	Victoria	—
Colyer Fergusson	Thomas C.	1889	,,	Bought the estate.

* In a map of Kent, Sussex (spelled Southsexe) and Middlesex, now at Barham Court, near Wateringbury, Kent, the place is marked as Mote. The date of the map is 1575.

† See illustration in Parker's Domestic Architecture, Vol. iii., Part ii.

North Side.



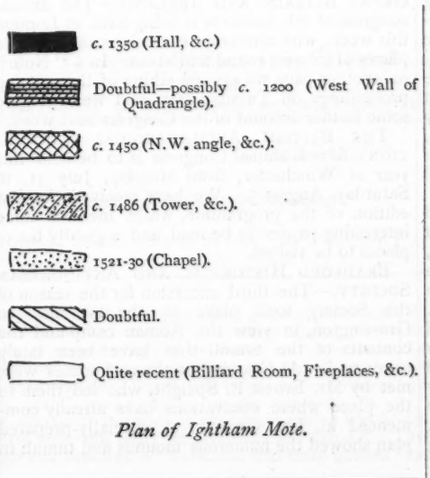
REFERENCES.

1. West Bridge.
2. Archway.
3. Dungeon.
4. Morning Room.
5. Dressing Room.
6. Library.
7. Servants' Hall.
8. Kitchen.
9. Scullery.
10. Court.
11. East Bridge.
12. Dairy.
13. Staircase.
14. Larder.
15. Crypt (or Cellar).
16. Wine Cellar.
17. Court.
18. Butler's and Footman's Bedrooms.
19. The Hall.
20. Housekeeper's Room.
21. Store Room.
22. Pantry.
23. Conservatory.
24. Wooden Bridge.
25. Staircase to Chapel.
26. Billiard Room.
27. Old Foundation for outer end of Drawbridge.
28. Penstock.

north end of the upper floor had been added previously, judging from the remains of a label over the north window.

The north end of the wall on this side facing the quadrangle exhibits, on the ground floor, two very narrow (almost lancet) windows, with plain hollow mouldings and pointed heads, and a pointed doorway with chamfered jambs and arch, and it is very possible that this part belongs, and is almost the only remaining portion, of the original twelfth-century house. The windows at the south end of the same wall on both stories appear to be comparatively modern, and of the same character as the remaining windows and doorway on the south and part of the east side of the quadrangle; they are believed to have been put in during the present century.

The noticeable rooms on this side are, on the ground floor, the morning-room, long and low with deeply recessed windows and a finely designed oak chimney-piece, erected in 1856 by the late Major Luard Selby. Adjoining this is the space supposed to have been a dungeon, 15 ft. by 5 ft., to which access was obtained from the


c. 1350 (Hall, &c.)
Doubtful—possibly c. 1200 (West Wall of Quadrangle).
c. 1450 (N.W. angle, &c.).
c. 1486 (Tower, &c.).
1521-30 (Chapel).
Doubtful.
Quite recent (Billiard Room, Fireplaces, &c.).

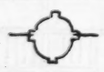
Plan of Ightham Mote.

first floor of the tower. On the north side of the archway is the billiard-room, made so by the present owner, who has panelled the walls in oak, inserted grotesque oak corbels under the beams, formed two fireplaces (one with an ingle-nook) and altogether made it, with its deeply recessed splayed windows, into a very beautiful room, though unavoidably low. This work, and a good deal besides, was executed last year by Mr. Spokes of Oxford. Over this is the old drawing-room, 40 ft. by 17 ft., with the remarkable Jacobean oak chimney piece, now illustrated (see lithograph plate), the work of the second Sir William Selby, about 1620-30. Especially noticeable is the carved oak border surrounding the conchological marble front of the fireplace, the latter being apparently a subsequent addition, and possibly of the same date as the singularly ugly Classic window which has replaced the fifteenth-century window at the north end of the room. The walls of this room are hung with an extremely old Chinese paper, supposed to be about two hundred years old, which has been recently restored with

good care, and an additional fire-place at the N.W. angle has also been recently added. The paper is surmounted by a carved oak frieze with Saracen's heads (the Selby crest) at intervals. The passage leading to this room and the small tower-room are oak panelled, with linen-roll panelling from floor to ceiling.

A door leads from this drawing-room to the chapel staircase (recently rebuilt and panelled), which is surmounted by an eighteenth-century bell turret and clock, and also to the chapel, the reconstruction of which has just been very successfully completed without in any appreciable way altering its character, and with as little disturbance as possible to the details of the old work. This is a remarkable little chamber, 35 ft. by 16 ft. (see illustration) with a painted waggon ceiling, the ribs and interspaces being covered with cognizances and emblems of various families, both regal and private. The structure is very slight, timber-framed, and lined, and was probably the work of Sir Richard Clement, whose arms, with those of his first wife, who died in 1828, occur in several places. It is remarkable how closely the design of the carved panels of the pulpit correspond with some at Layer Marney in Essex *temp.* 1530. Underneath it is a doorway communicating with a wooden bridge which leads on to the bowling-green. The side next the quadrangle is carried on oak piers and an oak arcade enclosing a small conservatory, the piers and arches, &c., having been recently introduced by a skilful piece of underpinning, in substitution for the brick piers which formerly supported the chapel.

The north-east corner of the house is one of the most complicated of the many archæological puzzles which this house presents. Stone mullioned windows, with quarter-round and fillet moulding both inside and out



to mullions, jambs, and heads, characterise this part, a part between the chapel and the drawing-room, and also another part which lies immediately to the south of the east bridge. With the exception of the windows over the scullery, they have no labels, and even over those the labels have no returns, but in some cases the labels may have been removed when the overhanging timber structure of the upper story was built. This part of the upper floor is probably of the same date as the chapel, *i.e.*, about 1530, from which it is separated by a priest's room and a confessional. There are examples of square-headed, mullioned, and transomed windows in domestic residences of both the fifteenth and fourteenth centuries, and there seems to be strong grounds for assuming that these parts of the house were erected about 1450, possibly by Richard Haut, who was a very considerable person.

Passing the vestiges of what appears to have been a cloaca overhanging the moat near the north-east angle, we come on the crypt or cellar, with vaulted ceiling of the usual type of the fourteenth and thirteenth centuries. It is a small chamber, only 19 ft. by 12 ft. and 8 ft. in height to the intersection of the ribs, which have plain chamfered arises and are carried on plain brackets. It is lit by a two-light Decorated window corresponding to the work of 1340-50. It carries a room of the same period of architecture, which was the chapel of that date; but the window is not of the same character as that of the crypt, and has probably been introduced subsequently: its head has perished and been replaced by a wood lintel. A Decorated piscina occurs in the west wall, and in the same wall is a doorway corresponding in style and moulding to the east doorway of the hall below; it communicated with some other rooms which have since been altered.

Contiguous to this chapel are two rooms whose gable ends face the quadrangle and exhibit singularly beautiful examples of sixteenth-century open-work barge-boards, in which the rose, thistle and shamrock are intertwined: one of these rooms has a mullioned and transomed oriel window.

Adjoining these rooms, and altogether detached from the line of the moat wall, lies the hall, built about 1540-50, probably by Sir Thomas Cawne, or Couen, whose finely-carved effigy in Caen stone lies under a Decorated canopy in Ightham Church. This hall is 30 ft. by 20 ft., and 35 ft. in height; the roof is high pitched, and carried partly by a pointed stone arch not quite centrally placed, very similar to the stone arches at Mayfield in the same county, and, to a certain extent, by curved timber principals at each end. These arches are similarly moulded, and are supported, each in their own material, by corbels representing quaint human figures in grotesque postures. The fireplace is of the fifteenth century, as also is the five-light west window, and they were probably constructed by Edward Haut about 1486, though the arms of Sir Richard Clement have been subsequently inserted into the glass.

A very beautiful two-light transomed Decorated window (blocked up for many years and only re-opened in 1872) occurs on the east side. On the outerside of this window, which looks on the back entrance and east bridge, the pointed heads of these lights have quarter round and fillet moulding filled in with hollow-moulded cinquefoil tracery, the three upper foils being broken with ogee countercusps. Enclosed by and overlying them is an octofoil light of similar description, the whole being headed by a characteristic dripstone. The inner side is not moulded, having been simply rebated for shutters in accordance with the prevailing custom of the period, and a Decorated arch lines the head of the splayed recess. The hall was formerly entered by a Decorated doorway direct from the quadrangle, but when it was panelled by Mr. Norman Shaw in 1872 and reconverted into a dining-room, a doorway was broken through the east wall into the vestibule, and the old entrance partitioned off from the hall for the sake of comfort. The present kitchen contains a window corresponding almost precisely with that on the first floor of the tower, and was possibly inserted at the same time, *i.e.*, about 1520-30.

The lower floor of the south front is of the same style as that of the west front, except the kitchen aforesaid and the small window in the servants' hall, which corresponds to that in the crypt, but the upper floor overhangs and is of subsequent date, partly Elizabethan. The library, another long, low room similar to the morning room, occurs on this side, the special feature of which is a very beautiful carved oak chimney-piece, also put up by the late Major Luard Selby.

The remainder of the house, though interesting, calls for no special remark, except to note the outer quadrangle opposite the west front, of which only the west side, consisting of picturesque sixteenth-century cottages, now remains.

As the late J. H. Parker remarked, 'To say this is a charming place says nothing, for this can be said of many a spot, but the Mote is a unique gem, unequalled in the county and perhaps in England.'"

C. E. L.

HOUSE, QUEEN'S-GATE.

THIS illustration shows a new front in terra-cotta and red brick which is now being put to a house in Queen's-gate which was originally faced in cement of an ordinary design.

The problem in modernising the house was to design a front which would be adaptable in style to most of the interior fittings and without interfering more than was absolutely necessary with the constructional work of the interior, the original plan of the house, and the windows and doors, &c., being retained.

New mantel-pieces in place of old marble ones and dado panelling have been fixed in the reception rooms and hall. Mr. I. Douglas is the contractor, the mantel-pieces having been made by Messrs Walker & Sons. Mr. R. A. Briggs is the architect.

The drawing from which the illustration is taken is exhibited at the Royal Academy.

ARCHÆOLOGICAL SOCIETIES.

THE ROYAL ARCHÆOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.—The annual congress of this Institute is being held in London this week, with numerous excursions and visits to places of interest round and about. In a "Note" on another page we say something of the opening proceedings on Tuesday last, and we will give some further account of the Congress next week.

THE BRITISH ARCHÆOLOGICAL ASSOCIATION'S fiftieth annual Congress is to be held this year at Winchester, from Monday, July 31, to Saturday, August 5. We have received the first edition of the programme, which includes some interesting papers to be read and a goodly list of places to be visited.

BRADFORD HISTORICAL AND ANTIQUARIAN SOCIETY.—The third excursion for the season of this Society took place on the 1st inst. to Grassington, to view the Roman camp and the contents of the tumuli that have been lately uncovered. At Grassington the antiquaries were met by Mr. Ernest E. Speight, who led them to the place where excavations have already commenced at Lea Green. A specially-prepared plan showed the numerous mounds and tumuli in this spot. The encampment contained mill stones, dwellings, fireplaces, flint and stone implements, bronze rings, charcoal, ashes, and each tumuli had an inner and outer wall. To the north of Grassington is a much larger encampment which the discoverer, the Rev. Bailey J. Harker, calls Roman. The area covers 160 acres. The remains which have been unearthed are exhibited in the Mechanics' Institute at Grassington.

LANCASHIRE AND CHESHIRE ANTIQUARIAN SOCIETY.—On the 8th inst. about twenty members of this Society paid a visit to Lichfield. The members were conducted over the Cathedral by the verger and one of the members of the Society, the Rev. E. F. Letts, M.A., who afterwards read, at the west front, a short description of the principal points of interest in the building.

DURHAM AND NORTHUMBERLAND ARCHÆOLOGICAL AND ARCHITECTURAL SOCIETY.—On the 23rd ult. a visit was made by this Society to Teesdale. The party, numbering sixty-six persons, assembled at Barnard Castle Station, where carriages were in waiting. They then drove by way of Straithforth to Egglestone Abbey. Here the Rev. J. F. Hodgson, after a few introductory remarks by the President (Rev. Dr. Greenwell), described the buildings, and gave an account of the history of the Abbey and the dates of the various buildings and alterations. It was founded, according to Dugdale, by Ralph de Mutton, about 1190. In 1370 the chancel was rebuilt, and the south transept shortly after, and later still the nave was rebuilt and widened 5 ft. The existing remains, which include the nave and part of the chancel and south transept, and also the domestic buildings, were examined, also the fourteenth century tomb to T. Rokeby in the nave. Great regret was expressed at the recent demolition of a part of the domestic buildings, which occurred two or three years ago. The party then proceeded to the banks of the Tees to the Dairy Bridge, near the juncture of the Tees and the Greta, passing on the way the ancient churchyard of Rokeby. Here they visited Mortham Tower, a fortified house of Late Gothic work. Wycliffe was also visited, where the party were received by the vicar and General Blain. The church, built about the middle of the thirteenth century, was examined. Rev. J. F. Hodgson here gave a description of the building and its architecture. A great deal of the ancient stained glass, contemporary with the windows in which it is inserted, still exists, much of it set with medallions and shields.

PRIOR THOMAS SILKSTEDE'S SCREEN, WINCHESTER CATHEDRAL.

THE Christian name of the Prior may be read in the bosses of the cornice, the letters M.A. being given the place of honour; and his surname appears in the larger S and double rebus. Like all Silkstede's work, it is most accurately wrought, by, one might imagine, some very old mason with the traditions of the Decorated period still in his mind; for the Prior died as late as 1524. The door is patchwork, the curious lock being ancient; and in the floor of the chapel is an inscribed slab covering the tomb of Isaak Walton.

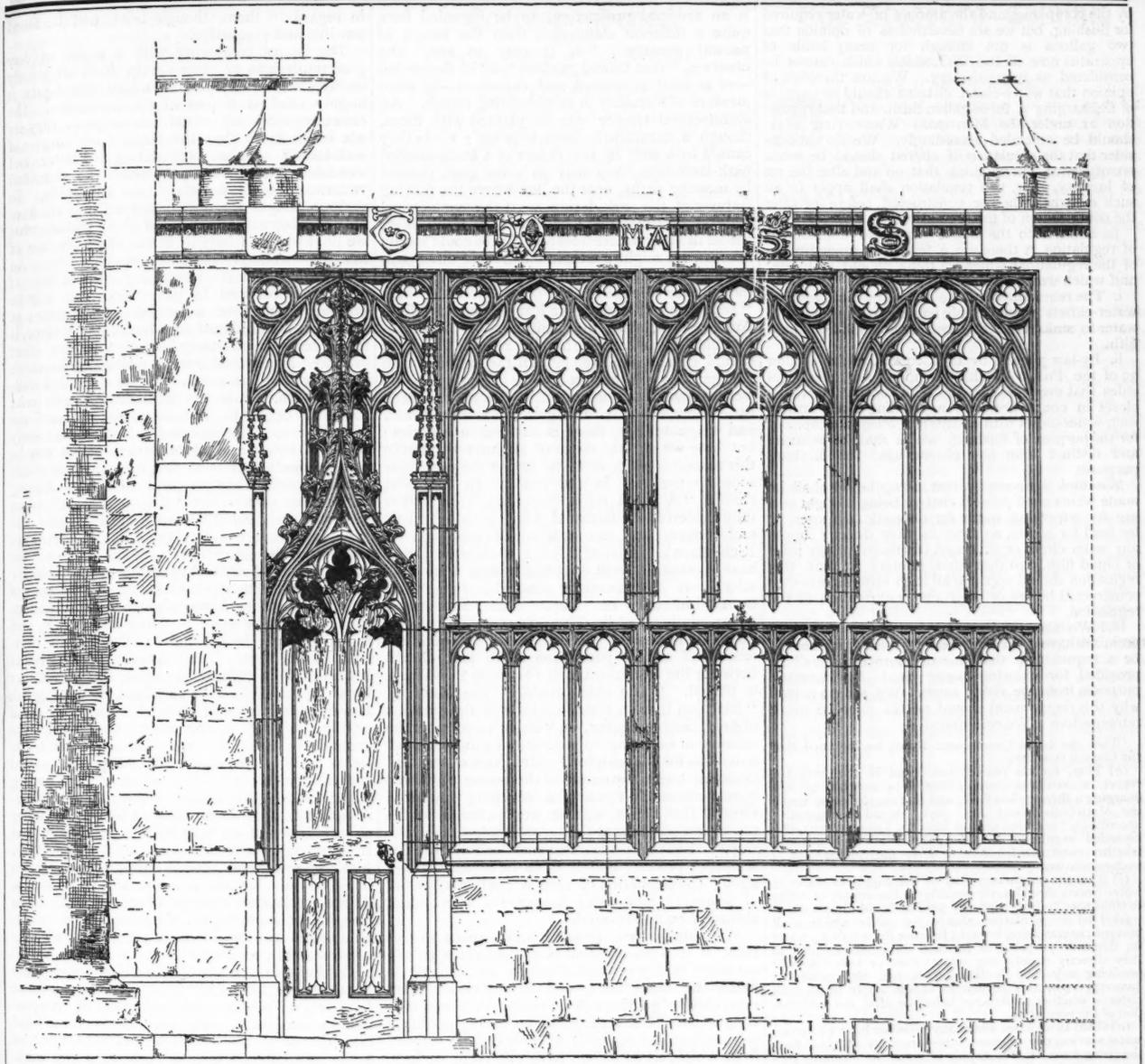
R. M. D. L.

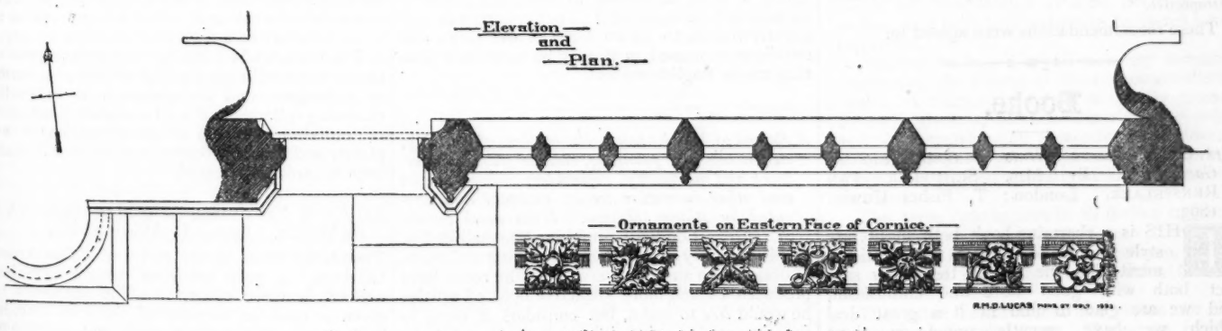
CAPACITY OF WATER-CLOSET FLUSHING CISTERNS.

AT the meeting of the London County Council held last week, the Public Health and Housing Committee reported on this subject as follows:—

"Regulation No. 21 made by the water companies under the Metropolis Water Act, 1871, provides that every water-closet cistern or water-closet service-box, fitted or fixed after the confirmation of the regulations, in which water supplied by the companies is to used, shall have an efficient waste-preventing apparatus so constructed as not to be capable of discharging more than two gallons of water at each flush.

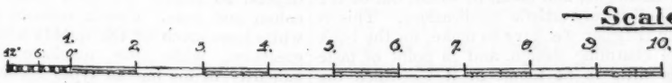
The Local Government Board, to whom the power of confirmation of the water companies' regulations under this Act was transferred in 1875, has forwarded to the Council a copy of correspondence that has passed between it and certain of the sanitary authorities of London and the water companies respecting a proposal that regulation 21 should be altered so as to provide that every water-closet, cistern, or service-box shall be so constructed as to be capable of discharging three gallons of water at each flush. The Board asks for the Council's observations on the subject. Many of the sanitary authorities consider that a two-gallon flush is inadequate, while the water companies contend that two gallons are sufficient when proper apparatus is provided.





Prior Thomas Silkstede's Chapel in the South Transept of Winchester Cathedral: the Screen.

Scale.



(Measured and Drawn by Mr. R. M. D. Lucas.)

and that when the flush is unsatisfactory, the reason generally is because the down pipe from the cistern to the pan is of too small a diameter, and the inlet into the pan also too small. This, they assert, destroys the efficiency of the flush. The companies also state that to increase the size of the cisterns as suggested would involve an enormous increase in the quantity of water to be provided, and seriously affect the present undertakings and works of the companies, in addition to causing great expense and inconvenience to occupiers of dwelling houses.

We have given careful consideration to the views expressed in the various letters forwarded by the Local Government Board, and have received reports from the Council's officers on the question. We have also made inquiries of six municipalities which control their own water supply, and learn that Edinburgh and Bradford have decided that three gallons should be required, while Leeds allows two-and-a-half gallons in special cases. At Glasgow, Liverpool, Leeds, and Dublin, two gallons are used, but the City Engineer of Dublin is of opinion that this quantity is too low.

With regard to the statement of the water companies respecting the effect of imperfect apparatus upon the flush, we do not deny that there is an intimate relation between the conditions indicated

by the companies and the amount of water required for flushing, but we are nevertheless of opinion that two gallons is not enough for many kinds of apparatus now in use in London which cannot be considered as unsatisfactory. We are therefore of opinion that water-closet cisterns should be capable of discharging a three-gallon flush, and that regulation 21 under the Metropolis Water Act, 1871, should be amended accordingly. We do not consider that the regulation if altered should be made retrospective, but we think that on and after the 1st of January, 1901, this regulation shall apply to all such cisterns, whether constructed before or after the confirmation of the regulation.

In addition to the above suggested amendment of regulation 21 there are a few other amendments of the regulations which we think should be made, and which we now submit—

i. The requirements as to the supply of water to water-closets should apply equally to the supply of water to sinks used for receiving any solid or liquid filth.

ii. By-law 3 made by the Council, under section 39 of the Public Health (London) Act, 1891, provides that every person who shall construct a water-closet in connection with a building shall furnish such water-closet with a cistern of adequate capacity for the purpose of flushing, which shall be separate and distinct from any cistern used for drinking purposes.

We think it necessary that a regulation shall be made which shall prevent cisterns being brought into use for supplying water for domestic purposes, or for food for beasts, so long as they directly supply any water-closet or sink used for receiving any solid or liquid filth, and that after January 1, 1901, this regulation should apply to all such cisterns, whether constructed before or after the confirmation of the regulation.

iii. We also think that in all cases where any premises have a constant water service there should be a requirement that one or more traps shall be provided for drawing water used for domestic purposes from the rising main. We see no reason why this requirement should not at once be made retrospective. We recommend—

'That the Local Government Board be informed that the Council considers—

(*a*) That, for the reasons mentioned in the foregoing report, water-closet cisterns should be capable of discharging a three-gallon flush, and that regulation 21 under the Metropolis Water Act, 1871, should be amended accordingly; and that on and after 1st January, 1901, this amended regulation should apply to all such cisterns, whether constructed before or after the confirmation of such regulation.

(*b*) That the requirements as to the supply of water to water-closets should apply equally to the supply of water to sinks used for receiving any solid or liquid filth.

(*c*) That a regulation should be made which shall prevent cisterns being brought into use for supplying water for domestic purposes, or for food for beasts, so long as they directly supply any water-closet or sink used for receiving any solid or liquid filth, and that after 1st January, 1901, this regulation should apply to all such cisterns, whether constructed before or after the confirmation of the regulation.

(*d*) That in all cases where any premises have a constant water service, one or more taps should be provided from the rising main for the supply of water for drinking purposes; and that this requirement might at once be made retrospective.'"

These recommendations were agreed to.

Books.

Art Out-of-Doors: Hints on Good Taste in Gardening. By Mrs. SCHUYLER VAN RENSSELAER. London: T. Fisher Unwin. 1893.

THIS is a charming book both in literary style and make-up, with the additional merit that the author treats her subject both with good taste and enthusiasm, and we are glad to find in it a great deal which we have recently urged in these columns in connexion with the treatment of gardens in relation to architecture. Mrs. Rensselaer does not appear, as far as we can gather from the book, to have gone into very extensive reading on the subject; she refers to one or two authors in support of some of her views, but passes over the rather large bulk of old English literature on the subject, and appears also to be unacquainted with Mr. R. Blomfield's valuable little book on "The Formal Garden," to which no reference is made, and in which she would find a great deal said, from the architect's point of view, which is in entire support of her theories. Her own innate taste, however, has led her in the right direction, and possibly her book may be of special value in her own country, where we imagine (partly from the evidence of her own pages) that the consideration of this class of subject has not progressed as much as with us.

Without adopting any extreme views in regard to formal and informal gardening, Mrs. Rensselaer fully perceives and enforces the fact that a garden is an artificial production, to be regarded from quite a different standpoint from the beauty of natural scenery. "It is easy to see," she observes, "that formal gardens must be demanded—or at least supported and explained—by some measure of formality in neighbouring things. An architectural terrace may be planted with them, though a naturalistic lawn may not; while they cannot look well in the centre of a freely-treated park-landscape, they may in some spot, defined by meeting paths, near the line where the flowing features of the park-design meet the symmetrical features of the street; and in very small open spaces in a city, where trees and shrubs could hardly flourish, we might use them much more often than we do. In fact, they are artistic when they look as though they belonged in the place where they lie." "Belonged in" is what we fear we should call an Americanism, but the sentiment is incontrovertible. Elsewhere, we find the remark that "we should gain in our large cities if the architect who does public work took an interest in gardening and were allowed to express it." There has been little enough of this in England in modern times, and we gather that there is still less in America; but here we see the dawn of an improvement in this respect, and it is to be hoped the same may soon be the case in the States. In the short chapter "A Word for Architecture" the author fully perceives the falsity of what is called rustic architecture, and has a word of criticism for Richardson's gardener's lodge at North Easton near Boston, "built of huge rough boulders," which is characteristic enough, but "has been imitated in ways that Richardson never anticipated." The chapter on "out-door monuments" is also full of excellent sense and artistic perception as to the relation between the monument and the scene in which it is placed. "The chief trouble," she observes, "has been that we think too little of the question of site," and moreover, we "ought to consider the monument as having opportunities for the architect as well as for the sculptor." Mrs. Rensselaer mentions one terrible example of the wrong way to do it in the case of a figure of a crouching panther in Central Park, "set, without any pedestal, on the top of a vine-covered rock overhanging the driveway." She adds that this was done against the sculptor's protest; and it is to be hoped that her strong condemnation of such a puerile treatment of sculpture may avail to prevent any similar absurdity being repeated.

We should have devoted more space to this book if it were not that we have recently had occasion to say a good deal on the subject on much the same lines, and it would be mere repetition to go through it again. We can only congratulate Mrs. Rensselaer on having produced so excellent and readable a book on the subject, from which, as far as we have observed, we have hardly a word of dissent to offer, and cordially recommend the study of it to her countrymen and countrywomen, to whom some of the views and criticisms expressed in it may be more new than they are to English readers.

A Record of Work: being illustrations of printing, stencilling and painting, stained glass, cabinet-work and marquetry, embroidery, woven fabrics and other decorative works, designed and executed by Aldam Heaton. With notes by the designer. London: Simpkin, Marshall & Co.

In his prefatory note to this charming collection of designs the author observes that he could have produced a much more attractive book of articles he would *like* to make, but considers it more to the purpose to give illustrations of what he actually has produced, to order. This is true in a sense, but it is rather a pity that, by adding to most of the designs a note of the price for which they were and can be produced, he has given to the book a little too much the aspect of a trade catalogue, and taken it, so far, out of the category of purely artistic publications. This is the only criticism we have to make, for the book is full of charming design, and in point of taste there is little to be found in it to which the most captious critic could take exception.

Mr. Heaton gives a list in the preface of certain enemies of his, the death of which he is glad to chronicle. Among these are "the huge drawing-room mirror, rounded at the top, like a mould of jelly"; "the 'handsome' white marble chimney-piece"; "the plaster ceiling-rosette, usually out of scale with the ceiling which it spoils," and one or two others. We heartily rejoice with him over the death of these enemies, if indeed they be really dead, but they die rather hard. The comments on various classes of furniture and what is to be desired and avoided in regard to them, though brief, will be found sensible and suggestive.

The plates commence with a series of very graceful designs of overmantels, built on strictly architectural lines, and in which the figure is largely used as a part of the decoration. The chimney-pieces are rather less original, they are not much more than the elegant working up of well-known classes of detail. Plaster and stencilled friezes follow, of which the stencilled varieties, No. 18 especially, are admirable. To various designs for ornamental ceilings we have only to object that several of them include what we hold to be a falsity in taste, viz.: the use of hanging wreaths designed horizontally. An ornamental detail simulating the effect of curvature produced by gravitation can only be properly applied on a vertical wall surface; as soon as it is introduced on a horizontal surface, it it becomes an arbitrary imitation of an effect produced by physical law, in a situation in which that law could not act. Of the stencilled wall-papers, No. 28 is too naturalistic, and looks as if it ought to be hand-painted; and the parts are too unconnected. No. 29 is vastly superior, being a kind of design which can be perfectly well done in stencil, and which it would not be worth while to paint by hand. Among the ceiling papers the "Ducal Palace," taken from the celebrated Venice building, and the "Felday," designed by Mr. E. P. Warren, are admirable, the latter the best; but it should be borne in mind that they are only suitable for rather large and sumptuous rooms. For rooms of ordinary dwelling-house scale a ceiling pattern should always be small in detail and design, and rather delicate in character; otherwise it overweights the room. The "Abinger" ceiling paper is admirable in style in this sense, but still rather large in scale. The wall-paper, "old English flowers," is more the style of work for a small ceiling, as far as character and scale are concerned; we do not say it would do for a ceiling paper, as it suggests upward or continuous growth, whereas a ceiling paper should always have a centralised appearance in the lines of its design; but as a matter of scale it would do very well for a ceiling, and is rather light and thin for a wall. The "St. Mark's" wall-paper, from a sculptured decoration in St. Mark's, Venice, is a fine and very suitable design, a happy instance of adaptation. The designs for stained-glass windows show admirable figure-drawing, in entire accordance with the conditions of the material.

Passing over a couple of very delicate and pretty floral designs for marquetry, we come upon some furniture, a little too much in the taste of Chippendale for our liking. We have always considered that the great merit of Chippendale's furniture lay in its admirably thorough execution and workmanship rather than in the style of design, which is too full of weak and rather wanton curves; it is the furniture of a somewhat frivolous society.

The book, while fulfilling very well its practical purpose of exhibiting the high ability of its author as a designer and draughtsman, is in itself a charming collection of well-executed illustrations of decorative work, in which everything is completely and carefully drawn, and no detail slurred over or carelessly treated.

Les Frères Van Ostade. Par MARGUERITE VAN DE WIELE. Paris: L. Allison et Cie.

THIS is the latest of the series of "Les Artistes Célèbres," a good many of which have been noticed in these columns. The authoress has given a readable account of the two Ostades, written in a true critical spirit, not exalting the Ostades to a higher place than they justly claim in art; recognising their real powers and not ignoring their limitations. The book is largely illustrated, though the effect of the illustrations is not the best for the works of these painters, who depend so largely for their effect on splendid colour and tone. Ostade reduced to black and white loses much of the quality which makes his greatness, while the repulsive ugliness and vulgarity of his human types seems exaggerated even beyond the reality. This was inevitable under the circumstances; but the book is in other respects a satisfactory addition to a very valuable series of artistic biographies.

Theory and Analysis of Ornament, applied to the work of Elementary and Technical Schools. By FRANCOIS LOUIS SCHAUERMANN. London: Sampson, Low & Co.

THE author of this book has a German name, and perhaps we may consider that it is the German tendency to theorise rather than illustrate which is exemplified in the book, including also some

rather German-English; "curvity," for instance (apparently meaning curvilinear quality), and other literary barbarisms. The book is thoughtfully written, and as an analysis is not uninteresting to read; but any suggestion which the student may get from it in regard to the theory of ornamental development appears to us more than counterbalanced by the bad and utterly inartistic character of the illustrations, which in this sense are German all over, and such as are hardly to be tolerated in this country nowadays. Even in the small diagrams drawn with a pen to illustrate points in the argument, we might expect to find from a teacher of ornament some degree of artistic style and touch, which is entirely absent here. The larger plate illustrations at the end of the book are not very good representations even when they illustrate fine and standard examples of ornament (which only a few of them do), and the original design, as we suppose it is, for an oakleaf bracket (No. 2), is positively one of the very worst things in the way of a design for carved ornament that we have ever seen; bad naturalism, without a trace of artistic breadth or convention, a kind of thing that it really makes one angry to see. We regret to have to say this, because the author certainly means well and has given a good deal of thought to what may be called the philosophical side of his subject, and some of his thoughts may prove suggestive to designers as to the direction in which they should work; but the book forms an unfortunate illustration of the fact that all the thinking in the world will not of itself produce a draughtsman or a designer.

Municipal Improvements: A Manual of the Method, Utility, and Cost of Public Improvements, for the Municipal Officer. By W. F. GOODHUE, Civil Engineer. New York: John Willey & Son, 1893.

THE words in the title, "for the Municipal Officer," explain the scope and intent of this small book. It is not a book for professional men, but a series of short chapters on the various classes of problems to be dealt with in public improvements, intended to assist gentlemen who are elected to sit on municipal councils with a knowledge of what are the objects to be arrived at in carrying out municipal improvements. Technical phraseology is purposely avoided, the object being to make the requirements of the case clear to those who would not understand technical terms. The author thoroughly understands the subjects of which he thus gives the outlines; and though the book is written by an American engineer for American town councillors, there is little in it, except some minor details as to materials, which is not equally true and equally applicable on this side of the Atlantic. English county councillors might find it worth their while to buy and study this small book.

We may note that on the subject of wood pavements the author expresses the same opinion which we have more than once expressed, but still more strongly:—

"Wood pavements in their best condition are simply makeships. They are not durable, do not wear smoothly, are not cleanly, and in a few years they become so rotten that they are a menace to the health of the inhabitants residing in the street in which such pavement is laid. A wood pavement that is well sprinkled in the summer months is as prolific of mosquitos as are the cedar woods in the wilds of northern Wisconsin."

Mosquitos do not abound in England, but wood pavements here have all the other objections which Mr. Goodhue urges against them in the States. One other remark about the importance of the state of city streets is worth quotation: "The stranger visiting a city for the first time does not always remember the handsome buildings it may have; but if its streets are execrable he never forgets them."

PULPIT, ENFORD PARISH CHURCH, WILTSHIRE.—The parish church of St. Margaret, Enford, has received an addition in the shape of a new carved oak pulpit, erected as a memorial to the late vicar. It is of Jacobean character, and has been designed by Mr. C. E. Ponting, F.S.A., architect, of Lockeridge, Marlborough. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

THE SANITARY INSTITUTE'S EXAMINATIONS FOR INSPECTORS OF NUISANCES.—At an examination for Inspectors of Nuisances, held at the Town Hall, Leeds, on Friday and Saturday, July 7 and 8, fifty candidates presented themselves. Of these, twenty-one candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of Inspectors of Nuisances.

Correspondence.

To the Editor of THE BUILDER.

THE FIVE-PER-CENT. SYSTEM.

SIR,—In a "Note" in your last issue [p. 26, *ante*], you comment upon a case, in the *Times'* report of which Lord Coleridge is made to say that he would not be a party to the custom—supported by the R.I.B.A.—of allowing charges, calculated at a percentage on the cost of works never executed, or "*not done*," as his Lordship put it. While I quite see the point of your "Note," I think there is something to be said for Lord Coleridge's views on the question, as I understand them. For my own part, I don't at all like the custom that architects have adopted of charging a percentage—by way of a fee—on the cost of works entrusted to them. This system is at best but a rough and ready method to adopt, which sometimes "pays," and quite as frequently does not. When, however, the works contemplated fall through, I think the percentage charge should most certainly be dropped, and a charge made for the "*work done*," viz., the various sketches, drawings, specifications, &c. Lord Coleridge could not say a word against such a charge, and architects would then be able to base their fees upon the skill, trouble, and time involved, instead of upon the problematical cost of a building which the architect generally values at one sum, while the builder estimates for it at another.

As long as we charge by *commission* we must lay ourselves open to the charge—which our enemies are not slow to make, of running up the cost of a building and introducing "extras," &c., for the sake of the commission. But even if individual architects like to charge in this way, I do not see why the Institute should encourage the custom; but given that this advisable, I do not see the necessity for reducing us all to the one dead level of 5 per cent. per head all round, Fellows and Associates alike. We cannot surely all be worth the same? and if not why charge alike? Personally I think the Institute should let us charge what we think fit and in our own way.

If "the Public" paid different prices for its architecture it might in time learn to distinguish the good from the bad. At present it is, I fear, encouraged to think that there is only "one quality" produced apart, of course, from sanitary arrangements. Why, for example, should the architectural R.A.'s. be "all one price," when the painters, for instance, vary considerably in their marketable value?

Even engineers, whose work is in some respects not unlike our own, have no fixed scale of charges; or at any rate their Institution in no way recognises any such scale, and leaves its members free to charge in any way that they think proper.

Of three things I am convinced—

1st. That the principle of charging a commission on the cost of executed works is a bad one.

2nd. That the principle is worse when it comes to be applied to works not executed.

3rd. That the Institute should not encourage in any way either of the above.

I have no doubt I shall be told that at a Conference of Architects, held on such and such a date, this and that was resolved. Very likely. My only reply will be, that the sooner another conference of architects will undo what the former one has done the better I, for one, shall be pleased.

LEONARD STOKES.

THE CHURCHES OF THE LEICESTERSHIRE WOLDS.

SIR,—In his description of the recent visit of the associated Architectural Societies to Melton Mowbray [see *Builder* for June 24, p. 487], your correspondent was in error in describing the tower of Waltham Church as of one date throughout: like so many others in the neighbourhood, the lower stage is of Early English date, while the upper portion is Perpendicular. Next to Melton and Waltham the most interesting church in the district is that of Burkminster, whose massive Early English steeple occupies an unusual position at the east end of the south aisle of the nave. The body of the church is chiefly Decorated, but the Perpendicular work of the chancel, aisles, and south porch is exceptionally fine. Internally this church is unique in the possession of a lofty octagonal turret, rich in panelling and tabernacle work, which stands free near the chancel arch and gives access to the belfry, formerly also doubtless to the rood-loft.

Other churches of interest, apparently passed by, are those of Eastwell and Eaton, the latter with a good oak screen, the former with a massive one of stone, consisting of a wall pierced with a central pointed doorway, and on each side a square-headed opening of three lights, with Late Decorated tracery. The church at Scalford is really fine, with a stately tower similar to those of Syston, Sileby, and Rothley, in a different part of the country. The district is rich in early fonts, some of great beauty, as Waltham. During the earlier periods, a pleasant colour effect was obtained by the use of the local ironstone, with Ancaster, Ketton, or Stanion stone as a dressing. Later, in the Perpendicular period, the more costly stone only was used. A. H.

The Student's Column.

GEOLOGY—III.

THE IGNEOUS ROCKS.

HAVING said something of the aqueous rocks, and their subdivision according to their fossil contents, we may now refer to the igneous. We have shown that the first aqueous rocks must have been derived directly from the wasting away of the igneous, but the student will readily perceive that, as time went on, and the aqueous by earth movements were caused to appear above the level of the sea, they, too, by their own denudation provided materials for subsequently deposited aqueous rocks. This process has been repeated up to the present day. Thus the consolidated igneous rocks which formed part of the original earth's crust, as they, in the ordinary course of events, sank beneath the waters, became covered up by a great thickness of aqueous rocks. And if we glance at a geological map of the world which represents the occurrence of the different kinds of rock as they now appear on the surface of the earth, we shall see that the igneous do not occupy such large areas as the aqueous. Nevertheless, they are extremely important for our purposes and must in no wise be neglected.

The only opportunities we have of examining igneous rocks are on the sites of volcanoes which are active, or have recently, in a geological sense, become extinct; and in other districts far more numerous, where the igneous rocks, once seated deep in the earth's crust, have been brought to the light of day by the all powerful agents of denudation, which have worn away the strata that formerly covered them up. Now, in the British Isles we have, fortunately, no active volcanoes, though there is good evidence in the Western Isles of Scotland, and in the north-west of Ireland, that volcanic action was in full display there during Tertiary times; and our observations here are consequently restricted to the second class of igneous rocks referred to—those that have been bared by denudation. In investigating these the geologist, however, is compelled to study the nature and effects of volcanic action abroad, and the curriculum of his education is not complete unless he has visited Vesuvius, Etna, Stromboli, &c. Failing that, he must be contented with minutely investigating the products of such volcanoes, which are found in most museums of natural history, and trust to written descriptions for the remainder.

From the foregoing it will be observed that igneous rocks may be divided into two main groups, (1) *volcanic*, which have been ejected from the throats of volcanoes, or are found at only a small depth from the vent in extinct volcanoes dissected by denudation; and (2) *plutonic*, which cooled and consolidated at some depth from the surface, and have been subsequently bared for our inspection.

Volcanic rocks.—We will now say something concerning the former of these groups—the volcanic. A volcanic eruption is usually attended by earth tremors, subterranean rumbling noises, and the expulsion, by successive explosions, of volumes of gases and vapours in the form of steam, &c., a great quantity of loose ejectamenta and lava.

The term *lava* applies to all molten rocks that have either been thrown out of the volcanic vent, consolidated in the neck of the volcano, or have been injected into surrounding rocks, from the neck.

The other ejectamenta are more or less fragmentary in character. During an eruption the disengagement of steam, contained interstitially in the liquid rock, forms a tremendous explosive which detaches portions of the molten matter, blowing them out of the vent high into the air. The pieces so detached range in size from light particles of dust, to lumps several feet in diameter. Vast quantities of these loose materials are disengaged, and fall around the crater, and on the sides of the volcano, thus producing a high conical mountain. The large fragments are called *bombs;* the minor *lapilli*, and the smallest *volcanic sand* and *ashes*. In addition, pieces of the rock through which the molten matter bored its way to the surface are also ejected, sometimes in great quantity.

The student will, therefore, see that an ordinary volcano is built up of successive layers of lava and fragmentary materials. The latter, in course of time, frequently become cemented together, making a solid rock. On the volcano being sufficiently denuded, these layers are often found to be cut up by igneous dykes, which are veins that have been injected into them from the central

pipe of molten matter. There are many types of volcanoes, however, each producing widely different features in the landscape. The volcano just described is conical in form, but its upper portions may be very much modified in shape by the violence of successive eruptions, and parasitic cones may form on its sides, creating a very irregular outline. Others are dome-shaped, or merely undulatory. The last-mentioned are not in active operation at the present day. They have been caused by what are known as "fissure eruptions," that is, gaping fissures have formed in the ground, through which lava has welled up and spread as a sheet over the surface of the surrounding country. There is every reason to believe that the manifestations of volcanic energy at present going on are not altogether representative of what has taken place in past geological periods.

2. *Plutonic.*—These rocks, having consolidated at some depth from the surface, or at least under great pressure, tell us nearly all we know concerning the probable condition of the reservoirs of volcanoes, or as to the state of matter which has once been molten at certain depths within the earth's crust. Familiar examples of such rocks are granite and syenite.

THE CLASSIFICATION OF IGNEOUS ROCKS.

(*a.*) *According to Structure.*—If we compare the minute structure of a hard piece of lava, with a sample of granite, one great difference at once strikes us. Under the miscroscope we see that the granite is made up entirely of crystalline minerals squeezed together and interlocking, or adhering to each other; whilst the lava, although usually containing crystalline minerals, contains also some cementing material binding them together, which may form the bulk of the rock. In other words, one is thoroughly crystalline, and the other is not. We are anticipating a little, but this seems a fitting occasion to draw attention for a moment to the circumstances under which those different structures have been produced. We know that the pressure under which an igneous rock has consolidated is the prime factor in determining its structure. When lava cools at the surface of the earth it does so under the pressure of the atmosphere at the place, plus so much of its own weight as may be above the points of consolidation. But when a plutonic rock cools, it is under the pressure also of millions of tons per square inch of superincumbent earth. We cannot now enter into other conditions which assist in the work, but it will suffice to repeat that, owing to their modes of origin, the plutonic rocks are always thoroughly crystalline in character, having no matrix between the crystals; whilst the volcanic are never thoroughly crystalline, and are often of a fragmentary and earthy character.

(*b.*) *According to Chemical Composition.*—If a lava and a granite present such divergent types of structure they are, nevertheless, frequently of the same approximate chemical composition. On the other hand, both lavas and plutonic rocks vary much amongst themselves chemically. Immediately it became known that the prime cause of their structure was pressure, it was realised that molten matter of the same chemical composition might produce very diverse types of rock, according as it cooled at the surface, or at great depths underground. This, amongst other things, has led to a chemical method of classification. Under this, all igneous rocks fall into three groups, depending on the proportion of silica they possess. These are (1) *acid*, containing over 60 per cent. of silica; (2) *intermediate*, between 60 and 35 per cent.; and (3) *basic*, less than 35 per cent. and rich in bases. There is every gradation between these classes, and it, therefore, sometimes becomes difficult to place a rock in its proper division. Like all other classifications of Nature's productions, this one is merely useful for purposes of reference, and from its constitution is necessarily arbitrary, more hypothetical than real.

CHANCEL SCREEN, PEWSEY PARISH CHURCH, WILTSHIRE.—A chancel screen designed by Mr. C. E. Ponting, F.S.A., architect, of Lockeridge, Marlborough, has been placed in the parish church of Pewsey. The work has been carried out by Messrs. Harry Hems & Sons, of Exeter. It is of English oak, and consists of five bays, the centre one forming the approach to the chancel.

TRADE FESTIVITY.—The *employés* of the firm of White & Sons, late Gibbons & White, metal workers, of Oxford-street, London, celebrated on July 8 the hundredth anniversary of its establishment, by a road excursion to Weybridge.

GENERAL BUILDING NEWS.

MUNICIPAL BUILDINGS, OXFORD.—The foundation-stone of the Oxford Municipal buildings was laid on the 6th inst. The architect of the new buildings is Mr. H. T. Hare, of London, the builder being Mr. J. T. Chappell. We published a perspective view and the two principal plans of the building in the *Builder* for July 9, 1892.

REBUILDING OF DUNCOMBE HOUSE, DUNCOMBE PARK, YORKSHIRE. — According to the *Leeds Mercury*, the rebuilding of Duncombe House, which was destroyed by fire on January 11, 1879, is proceeding apace. The foundation-stone of the new mansion was laid in February, 1891, and it will be at least another year before the house is ready for occupation. The principal structural work is, however, now completed. The style adopted is on the lines of the old house, with some modifications; but the strong Doric character of Vanbrugh's old design is preserved. The basement is most effectively planned, and the grand hall and saloon above are magnificent rooms. In the large saloon will be again placed the Feversham art collection, which was rescued from the fire. The hall is 40 ft. square and 30 ft. in height, and is to be furnished with stone dressings, fluted columns, with Corinthian capitals. The saloon is larger than the old one, but of the same design, with niches for the statuary. There are two large staircases—of oak and of stone—to the floors above; and there are about thirty bedrooms in the house, besides those in the servants' wing, which was not destroyed in the fire. The new chapel will be larger than the old building. The floors are all of fire-proof combination, and the house throughout will be heated by hot-water pipes (Haden's system), and lighted by electricity. The mansion has been built of freestone from Earl Feversham's own quarries at Farndale and Bladale. The architect of the new house is Mr. Young, of London; and the contractor, Mr. Kirkwood, Edinburgh. The probable cost of the new mansion is between 30,000*l.* and 40,000*l.*

LOWESTOFT.—The "Grand Hotel," Lowestoft, was opened on Monday last, occuping the site of a former private house which has been partly utilised in the construction, and the Hotel elevations carried out in the same style of red brick with terra-cotta dressings, with a frontage of 260 ft. The ground-floor contains a spacious hall, lounge and ingle nooks, decorated in Moorish style. A central corridor, 245 ft. long by 5 ft. wide, reaches from north to south, the ends having glazed casement doors leading into the grounds. On either side of this corridor, at the south end are suites of rooms, named — Suffolk, Norfolk, Essex, East Anglian, and Crossley, comprising on the east or sea front, sitting rooms, and on the west front bedrooms, these all having casement doors leading on to the lawns. The principal dining hall is 60 ft. by 25 ft. with three deeply recessed bays on the sea front. There are also coffee room, smoking lounge, and billiard room, the latter 40 ft. by 28 ft., with open timbered ceiling, containing two billiard tables, and having recesses for lounges, completely fitted lavatories, &c. The drawing room is a sumptuously furnished room 40 ft. by 20 ft., with two large recessed bays with glazed casement doors on the sea front. A central staircase leads to the first floor, lighted with lead-glazed windows with the arms of Norfolk, Suffolk, Lowestoft, East Anglia, and Essex. A central corridor also runs through this floor from north to south, having rooms on either side comprising suites of sitting, bed, and dressing rooms. The kitchens and offices in the centre of the building are on the ground floor, or level with the dining hall and reception rooms, but completely cut off from the hotel by passages, and form in fact a building by itself, so that no smell from the cooking can possibly permeate the hotel. The architect is Mr. Walter Graves, of London. The contractors, Messrs J. Youngs & Son, of Norwich, who have carried out the work under the immediate superintendence of Mr. E. R. Burch, the clerk of works. The sanitary work has been carried out by Mr. George Versey, of Lowestoft, conjointly with Messrs. John Bolding & Son, of London; the ironwork by Messrs. Barnard, Bishop, & Barnard, of Norwich; the ventilation system by Mr. Kite, of London; the gaswork and bellhanging by Messrs. Waller & Smith, of Lowestoft, and Messrs. Benham & Sons, of London; and the kitchen and stillroom apparatus have been supplied and fixed by Messrs. Thomas Waller & Co., Fish Street-hill, London. The hotel is entirely furnished by Messrs. Maple & Co.

CATHOLIC CHAPEL, SUDBURY, SUFFOLK.—On the 27th ult. the foundation-stone of a new Catholic chapel, to be erected on the Croft, Sudbury, near the site of the former chapel, was laid. Mr. Leonard Stokes, of Westminster, is the architect, Messrs. Grimwood & Son being the contractors. The new chapel will consist of a nave of five bays, with chancel, and Lady chapel on the north side of the nave, and also a large sacristy under the chancel. There will be a small tower, surmounted by a fleche, containing a bell. In the west front will be a six-light window. Over the porch door will be a group of niches, intended for figures of the patron saint of the church and of the diocese. The style of the building will be Late Decorated.

MISSION CHURCH, ELDWICK, YORKSHIRE.—The foundation-stone of a mission church was laid at Eldwick a short time since. The church—the plans of which have been prepared by Messrs. Armistead & Parkinson, of Bingley and Bradford—will be built on a site near the main road at Eldwick, and the structure will be of stone. There will be chancel and nave, with a vestry on the south side of the chancel. Under the vestry is the heating chamber and a room. The heating will be by hot water, on the low-pressure system. The contractors for the various works are:—Masons' and joiners' work, Messrs. W. Ives & Co., Shipley; plasterer, Mr. H. Spurr, Bingley; slater, Mr. W. Thornton, Bingley; plumber, Mr. J. Hodgson, Manningham; and painter, Mr. J. W. Anderson, Bingley.

NEW CHURCH, KETTERING.—The foundation stone of the new permanent Church of St. Mary the Virgin was recently laid at Kettering. The nave and aisle of the church will be 93 ft. by 44 ft., and the chancel 40 ft. by 25 ft. In addition there is a vestry for the clergy and choir, and an organ chamber. The structure is being built both inside and out mainly of the local sandstone, relieved with dressing of local Weldon stone. The roof will be of red Broseley tiles. Mr. G. Henson, of Wellingborough, is the builder, and Messrs. Gotch & Saunders, of Kettering, the architects.

BOYS' CLUB AND GYMNASIUM, BRISTOL.—On the 22nd ult. the memorial stones were laid of the buildings in connexion with St. Agnes' Church, Bristol, which are to be set apart for the purposes of a Boys' club. The club is being built from the designs of Mr. W. W. Bethell, of London, by Mr. George Downs, On the basement there will be a playroom, 28 ft. 6 in. by 27 ft.; a carpenter's shop, 23 ft. by 19 ft. 6 in., together with three baths, lavatory, &c. The senior boys' rooms on the ground floor consist of a gymnasium, 61 ft. 9 in. by 27 ft. 6 in., with a height of 23 ft. There is on the same floor a games' room, 28 ft. 9 in. by 27 ft., and a reading room. On the first floor, which is to be set apart for junior boys, there is a games' room and drill room combined, 61 ft. 5 in. long with an average width of 29 ft., and a reading room. The building is of Pennant and Bath stone, the roof being covered with Broseley tiles. The windows are filled in with traceried Bath stone.

NEWMARKET STABLEMEN'S INSTITUTE. —This building was opened on Tuesday last by the Prince of Wales. It stands in Vicarage-road, and contains a committee-room (over the vestibule), a concert-hall measuring 70 ft. by 35 ft., and 26 ft. high, a library, kitchen, and offices. The style is, we read, the Italian Renaissance, executed in red brick, with copings and ornamental stone-work of red Mansfield stone. The work has been carried out, at a cost of 4,000*l.* by Mr. John Bentley, of Waltham Abbey, under the immediate charge of Mr. Holgate, from the plans and designs of Messrs. A. S. Manning, M.A., and Mr. William C. Manning, of Newmarket, architects.

ENLARGEMENT OF HORFIELD CHURCH, GLOUCESTERSHIRE.—The foundation-stone of the enlarged portion of Horfield Parish Church was laid the other day by Mrs. Pigou, the wife of the Dean of Bristol. The scheme includes a new chancel and two transepts, but at present only the chancel is to be proceeded with. The builders are Messrs. William Cowlin & Sons, and the architects Messrs. Crisp & Oatley.

POST OFFICE, BRIERLEY HILL, STAFFORDSHIRE.—The new building in High-street, Brierley Hill, is being rapidly proceeded with, and it is expected that the work will be completed towards the end of the year. The office will be completely fitted up, the public office being 27 ft. by 19 ft., the telegraph instrument room 17 ft. by 13 ft. 6 in., and the sorting office 60 ft. by 22 ft. The building, which will be of Ruabon brick, with stone dressings, will have a frontage of 35 ft. 6 in. to High-street, and there will be an open passage 7 ft. wide at the side. The work is being done by Mr. C. A. Horton, builder, under the supervision of Mr. E. J. Serchfield, of her Majesty's Office of Works.

WESLEYAN CHURCH, CONSETT, DURHAM.—The new Wesleyan church which has been built at Consett, in the main street, adjoining the Town Hall, was opened recently. The church will provide accommodation for 500 persons on the ground floor and 350 in the gallery. The external walls are of stone, faced with blockers having dressed facings. The style of architecture adopted is Late Gothic. At the south-west angle is the tower, the stop stage of which is pierced with traceried windows. The contractors for the buildings are Messrs. E. & J. R. Taylor, Benfieldside; and the architects are Messrs. Lamb, Armstrong, & Knowles, of Newcastle.

PREMISES, GIRLS' TRAINING HOME, WALKLEY, NEAR SHEFFIELD. — The building at Walkley which was used for many years for Mr. Ruskin's museum has just been converted into a Girls' Training Home. Mr. H. W. Lockwood, of Sheffield, was the architect who carried out the alterations and additions to the premises. On the ground floor there are now entrance hall with committee and waiting rooms, dining hall, schoolroom, matron's room, kitchen, store and cloak rooms. On the first and second floors are dormitories for about fifty girls. The laundry block comprises receiving and despatching rooms, warehouses, laundry, and store room. The buildings are of stone from the Bole Hill quarries. The contractor was Mr. J. Midwood, and the laundry has been fitted up by Mr. Harper Twelvetrees, of Manchester.

PARISH CHURCH, PEASEDOWN, SOMERSETSHIRE.—On the 24th ult. the consecration took place of the churchyard and new parish church of St. John the Baptist, Peasedown. The architects of the new church are Messrs. Bodley & Garner, of London, and the contractor Mr. Franklyn, of Diddington, Oxford. The chief material used was Bath freestone. The church, which is arranged with a view to possible enlargement, seats 450 people, and consists of two transepts, a side chapel, and two vestries. There is an open chancel and an oak screen, and rising at the west end of the building is a bell turret.

RESTORATION OF PENDOYLAN PARISH CHURCH, GLAMORGANSHIRE.—The tower of Pendoylan Parish Church, Glamorganshire, has just been rebuilt, and the interior of the building renovated. The church is dedicated to St. Cadoc, and is in the Early Perpendicular style, but the foundations of the tower are Late Norman or Early English. The tower has been rebuilt by Mr. Haines, of Canton, Cardiff, the architects being Messrs. Bruton & Williams, of Cardiff. The re-arrangement of the interior gives increased accommodation for about forty worshippers, and includes the provision of a new pulpit, reading-desk, and lectern.

BOARD SCHOOL, PAISLEY.—A Board School is being erected at Williamsburgh, Paisley, which is expected to be opened early in September. The building is to be constructed of red Ayrshire sandstone, is two stories in height, with basement or underground flat in which the heating apparatus is stored, and measures 128 ft. in length by 80 ft. in breadth. The bottom flat of the school proper is principally taken up with a muster-hall, off which staircases lead to the upper flat. On the east side of this hall is the initiatory department, with the headmaster's room at the north end, and the headmistress's at the south end; while the west side is occupied by four class-rooms. At either end of this flat are ordinary class-rooms, each capable of accommodating seventy scholars. The senior and industrial departments are placed on the upper flat, as are also rooms for the male and female teachers. The ceiling of each of the rooms is 14 ft. in height. Sliding partitions have been constructed in most of the departments. The building will be heated by means of hot air. A gymnasium has been fitted up immediately behind the school, and a workshop has been erected in a separate part of the grounds, in which Sloyd work will be taught. Two large playgrounds have been laid off, and several play-sheds have also been constructed. The work of construction has been carried out under the direction of Mr. Charles Henderson, master of works, Paisley. The architect is Mr. T. L. Watson, Glasgow.

FOREIGN AND COLONIAL.

FRANCE.—The committee which had been formed to erect a statue of Watteau at Nogent-sur-Marne, has now definitely decided that the statue should be erected in the Luxembourg garden.——The "Exposition Internationale du Progrès" is to be opened at the Palais de l'Industrie on the 22nd of this month.—The Louvre Museum is taking the opportunity, on the occasion of the inauguration of the Salle des Antiquités Africaines, on the 10th of August, to celebrate the hundredth anniversary of its foundation.——The *Journal Officiel* publishes the decree of "utilité publique" in favour of the prolongation of the line from Moulineaux up to the Esplanade des Invalides, and it is probable that the railway company "de l'Ouest" will commence the necessary works very shortly.——The town of Argenteuil has opened a competition for the construction and arrangement of a large abattoir.——The design by the Duchesse d'Uzès which has obtained the prize in the competition for a monument to Emile Augier comprises four groups placed against the four sides of a pedestal, on which will be placed a statue of the celebrated dramatist. The monument will be placed on the Boulevard de Valence, which overlooks the Rhone, and is opposite to the château de Crussol, the ancient seat of the d'Uzès family.——The Champ de Mars Salon closed last Monday.——On Thursday last the statue of Claude Chappe was inaugurated on the Boulevard St. Germain.——Last Sunday took place at Tarare (Rhône) the inauguration of the statue of Simonet, the founder of the muslin industry. The monument is the work of a Lyons sculptor, M. Bailly.——The third annual art exhibition at St. Germain-en-Laye (Seine-et-Oise) will open on the 27th of this month, closing on October 1.——The Special Committee of the Chamber of Deputies has adopted the scheme drawn up by the municipal engineers, MM. Humblot and Bechmann, for the "assainissement" of Paris and of the Seine. The scheme will cost 117,500,000 francs, which will be covered by a loan.—— The sculptors MM. Ernest Barrias, Antonin Mercié, and Tony Noël have been appointed members of the jury which is to decide, at Prague, the competition opened for the erection of a monument to John Huss.—— The formal inauguration of the statue of Joan of Arc at Chinon is fixed for July 30; and on the same day will take place the inauguration of the statue of Bayard at Mézières.——M. Paugoy, architect, of Marseilles, has been appointed general secretary of the "Association Provinciale des Architectes Français," in place of M. Gillet, who has resigned.——M. H. Lebœuf, architect, of Paris, has obtained the first premium in the competition opened by the Municipality of Toulon for the construction of a group of school buildings. The second premium was awarded to M. Alexandre Marcadier, architect, of Montpellier.——M. Camille Ruphy, President of the "Société des Architectes du Dauphine et Savoie," has died at Annecy. M. Ruphy, who was "Architecte de Bâtiments Civils" for Upper Savoy, was one of the original founders of the architectural society of which he was President. Among his principal works may be mentioned the "École Nationale d'Horlogerie" at Cluses, the "École Normale" at Bonneville and that at Rumilly, and the Hôtel du Montauvert.

BERLIN.—Professor Karl Becker has been re-elected President of the Prussian Royal Academy, which office he has held since 1882.——Professor Anton von Werner has just completed his large historical picture which illustrates the opening of the first Imperial Parliament by the Emperor William II. It will be exhibited at the International Art Exhibition.——A fine piece of mosaic has been presented to the English Church by Empress Frederick. The English colony have given the church a new window, which has been designed by Herr Geiger, of Freiburg.——Some extensive alterations are now being made in the front of Schinkel's Royal Play-house. The remodelling of the back of the house, which included a new stage, has but lately been completed. The theatre is to be re-opened in September.——After the Emperor's decision in favour of the electric elevated railroad the authorities have decided to give Messrs. Siemens & Halske all facilities for getting to work at once. The railroad is to be opened by January 1, 1895. The main line forms a connexion from east to west on the south side of the city. Branch lines are to run northwards.——Herr von Grossheim, of the well-known firm of architects, Messrs. Kayser & von Grossheim, has been made a titular "Baurath." The distinction is considered to have been given somewhat late in the day.——The Central Market, which was the scene of a serious fire some time back, has been extended. The new blocks are larger than the original halls, and show every modern convenience. A part of the new extension was opened on the 1st. inst.——A valuable travelling studentship has been put at the disposal of the Prussian Academy of Sciences for the encouragement of archæological study. The studentship will be known as the "Gerhardt Bequest."——A competition for designs for a "colony" of artisans' dwellings has been decided. Messrs. Schreiterer & Below, of Cologne, won the first premium.——Owing to the large number of accidents with lamps, some elaborate experiments have been made under the auspices of the municipal authorities as to the relative merits of various burners, wicks, &c. The results of the experiments have been published, and the sale of the more dangerous forms of petroleum lamps will be prohibited. The bad fitting of wicks seems to cause most of the explosions of petroleum lamps.——Hamburg is to have electric tramways. The wires will be overhead, the necessary posts are to be architectually treated.

MUNICH.—The fiftieth anniversary of the formation of the Munich Art Society has been celebrated with much pomp, the chief event to mark the occasion being the ceremony of laying the foundation-stone of the new Artists' Home. The Munich modern school of painters unfortunately held aloof from the celebration.

VIENNA.—It has now been definitely decided to open a large international art exhibition in Vienna next year. The management of the exhibition will be in the hands of the local society of artists. The opening day will be the 1st of March, and the duration of the exhibition three months. A number of valuable prizes and medals are to be given, and the Government will patronize the enterprise.——Another new theatre is in course of erection, the necessary funds (some 70,000*l.*) having been voluntarily subscribed by about 500 citizens. The theatre will be known as the Raimund Theatre.

MISCELLANEOUS.

STABLE FLOORING BRICKS.—We have received a specimen of a new flooring brick, "Durrans's Patent," made by Mr. Edwards, of Ruabon. The requisite roughening of the surface for foothold is obtained by corrugations forming a wave line in section, and arranged in groups of three places at right-angles to each other; the jointing is made in the hollow of one of the corrugations, and a projection of $\frac{1}{8}$ in. on the lower part of the brick ensures a uniform $\frac{1}{4}$ in. joint throughout. The general surface of the floor is in no way interfered with or divided by the jointing, and the corrugations form a uniform surface with no sharp edge or corner anywhere. The brick seems calculated to make an excellent stable floor.

ILLUMINATIONS ON THE 6TH.—Messrs. W. Sugg & Co. ask us to mention that they carried out the illuminations, for the night of July 6, at the Law Courts and Burlington House Branches of the Bank of England, the Union Bank of London, the Cordwainers' Hall, and the Institution of Civil Engineers.

PANYER ALLEY, NEWGATE-STREET.—We notice that upon the rebuilding of two houses on the east side of Panyer-alley, the sculptured figure of the Boy and Panyer has been again set up in the wall, very near to its original position. The stone—for which it is said an American visitor offered 50*l.* to one of the workmen a few months ago—formerly lay level with the pavement, but is now raised so that the inscription is level with the eye, and less likely to suffer injury from the traffic.

ATLAS ASSURANCE COMPANY'S OFFICES.—Mr. Waterhouse is superintending the interior reconstruction and the enlargement of the company's premises. These stand in Cheapside, between the ends of King-street and Ironmonger-lane, and were built of granite and stone, by Cubitt, in 1839. The company have taken temporary offices in the new buildings that have lately been erected on the site of St. Olave's, Old Jewry, whereof the tower alone has been preserved.

PUBLIC IMPROVEMENTS AT HEYWOOD, LANCASHIRE.—Mr. Frederick Herbert Tulloch, an Inspector of the Local Government Board, opened an inquiry at Heywood on the 5th inst. into the Corporation's proposal to borrow 41,500*l.* for sewage purposes, 26,850*l.* for private street improvements, 10,000*l.* for technical instruction purposes, 2,500*l.* for public baths, and 300*l.* for public weighing machines.

THE ELECTRIC LIGHT IN MANCHESTER.—The Manchester Corporation have been engaged for some time in preparing to supply the electric light to tradesmen, &c., in the centre of the city. It is stated that the work is now practically finished. It will be used in the Town Hall and other public buildings.

A NEW BATH.—We have had an opportunity of seeing, at the works of the Sanitary Bath Company, Limited, Camden Town, a new bath. It is, we understand, a Canadian invention, which, having been largely used in Canada and the United States, is now being introduced into this country. The chief point in the bath is that the body is made of sheet steel, lined with copper. The copper is tinned on the surface which forms the interior of the bath, the tinning being done by a new process which is stated to be thoroughly durable. The tinned surface is smoothly planished and brightly polished, and resembles, in fact, electro-plate. The internal surface of the steel body or casing is painted before the copper lining is placed in it. The advantages claimed for the bath are that there are no repairs to cracked enamel, and no repainting, to be done; that the metal does not chill the water as cast-iron or enamel does; that the bath is easily kept clean and bright, and always looks inviting; and that the whole is light, not unsightly, and needs no boxing-in. It is made to stand on raised legs, and is provided with a mahogany rim. Its exterior is capable of being decorated in any style. Supposing that the tinning is really durable and permanent, the bath appears to us to be one which is well worth the attention of our readers.

HOLLOW WALLS.—We have received a description and illustration of "North's Appliance" for keeping the cavity in hollow walls clear of rubbish as the work goes up. The appliance consists of two battens or strips of wood of any required length, and about $2\frac{1}{2}$ in. by $\frac{1}{2}$ in. with chamfered edges, connected at the bottom by a strip of canvas about $4\frac{1}{2}$ in. wide, and wedged into the cavity by either a block of wood, a piece of brick, or any other suitable means, and thus held in position. For taking the appliance out of the cavity, the blocks or wedges are knocked into the bag or sack, and the appliance is lifted out by means of a cord provided for the purpose at each end; it will then be found that the battens will close together, and the whole is lifted out clear of the walls and emptied ready for further use. By this means no holes are required to be left at the bottom of the cavity for cleaning-out purposes, and there is no making good to do afterwards. It appears to be a useful thing, provided that workmen and foremen can be induced to take the necessary trouble to place it and shift it effectually. The invention would, however, only be applicable where ties are not used.

MEMORIAL TABLET, ALL SAINTS' CHURCH, DULVERTON, SOMERSETSHIRE.—A memorial tablet to the late Vicar of Dulverton has been placed in the chancel of the parish Church of All Saints'. The tablet is of white Castalini marble mounted upon surroundings of veined and polished alabaster. Above all is the family crest and a ribbon bearing the motto, "Qualis vita finis ita." The work has been carried out by Messrs. Harry Hems & Sons, of Exeter.

THE "HOMACOUSTIC" SPEAKING TUBE.—The contrivance called by this name, invented and patented by Mr. H. A. Cutmore, engineer to the "Homacoustic Speaking Tube Company," is the speaking tube on the same principle as the ordinary speaking tubes in common use, but differing materially in the manner of its arrangement and adaptation for use. First, the signal to speak is not made by blowing down the tube, but by applying the hand to a plunger which compresses the air in a guttapercha ball, the whistle being a fixture at each end and quite independent of the mouthpiece. Thus the speaker can never have the annoyance of the whistle at the other end being off, or of receiving a puff in his face from some one calling him just as he

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
Hospital	Bramley (Leeds) Union	20*l.* 10*l.*	July 31
*School at Fulham	School Bd. for London	150*l.* 100*l.* & 50*l.*	Sept. 15

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Church, Woodstock-road, Belfast	Albertbridge Independent Church Com.	J Frazer & Son	July 18
Stables, Dwellings, &c.	Plymouth Corp.	C. Chadwell	do.
Four Houses and Shops, Osborne and King-streets, Glasgow		John M'Kissack	do.
*Making-up Roads	Tottenham Local Bd.	J. E. Worth	do.
*Engine and Boiler House, &c.	Ealing U.S.A.	Bramwell & Harris	do.
Wood Paving, Westwell-street	Plymouth Corp.	G. D. Bellamy	do
Additions, &c. to Farm Buildings, Wadsley Asylum, near Sheffield	West Riding C. C.	J. Vickers-Edwards	do.
Hospital, Amlwch	Anglesey U.R.S.A.	*Official*	do.
Additions to Goods Shed, &c. Warrington	Manchester Ship Canal Co.	do.	do.
*Pulling-down Houses	Acton Local Board	do.	do.
Culvert and Opening Watercourse	Wrexham Highway Bd.	do.	July 19
Alterations to Drying-rooms, &c.	Liverpool Corp.	T. Shelmerdine, Jun.	do.
Four Shops and Houses, Roundhay, Leeds		J. Kirk & Sons	do.
Church, Pant, Dowlais	Rev. Ll. Williams	E. M. Bruce Vaughan	do.
Chapel, Barnetby, Lincs.	Rev. P. T. Yarker		do.
Ashlar Setts	Halifax Corporation	E. R. S. Escott	do
Abattoirs, Stabling, &c. North Dean	Halifax Indus. Soc. Ltd.	Horsfall & Williams	do.
Hospital	Blaby (Leics.) U.R.S.A.	W. H. Simpson	do.
Re-building Dwelling-house, &c. Scragill, Whitehaven	Jno. Lachlison	Moffatt & Bentley	do.
National School Buildings, House, &c. Llanbraddach, near Caerphilly		E. M. Bruce Vaughan	do.
Whinstone, &c. Road Metal	Houghton-le-Spring Highway Board	D. Balfour	do.
*Painting, &c. Schools, Mitcham	Holborn Union	H. Saxon Snell	do.
*Public School	Great Clacton Sch. Bd.	T. H. Baker	do.
Two Brick Culverts, Markeaton and Kirk Langley	Derbyshire C. C.	J. Somes Story	July 20
Flagging (12,500 yds.) Kerbing, &c.	Cleethorpes - with - Thrunscoe U.S.A.	R. A. Robertson	do.
Granite Statue Pedestal, Belfast	Hanna Memorial Com.	Young & Mackenzie	do.
Alterations to Town Hall	Halifax Corporation	E. R. S. Escott	do.
School Buildings, Roseville-road, Leeds	Wesleyan School Com.	G. F. Danby	do.
School-Chapel, Morton, Lincs.	Rev. G. H. Howson		do.
*Shed, Leicester, Waiting Rooms, Ingleton, &c.	M. R. Co.	*Official*	do.
School Buildings	Sutton Local Board	do.	do.
*Granite, Sand, Flints, &c.	London CountyCouncil	do.	do.
Additions, &c. to School Buildings	Fawley (Hants) School Board	do.	do.
House and Slaughter-house, Longwood, Huddersfield		Arthur Shaw	July 21
Lodge, Windermere	D. Cloudsdale, J.P.	S. Shaw	do.
Iron Bridges, &c.	Assam Bengal Ry. Co. Lim.	W. Duff Bruce	do.
Workhouse Hospital	Hereford Union	W. W. Robinson	do.
Granite Road Metal (4,000 tons)	Ystradyfodwg (Glam.) Local Board	W. J. Jones	do.
Cabinet Works, House, &c. Warley-road, Halifax		Geo. Buckley & Son	July 22
Four Terrace Houses, Clayton, Yorks		Sam. Spencer	do.
Bridge (200 ft.) over River Mourne, Strabane	Donegal Ry. Co.	*Official*	do.
Alterations and Additions to Business Premises	Denaby Main (Yorks), Indus. Co-op. Soc. Ld.		July 24
Water Supply, Gamblesby	Penrith U.R.S.A.	G. Watson	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Road Formation, Drainage, &c. Weelsby, Grimsby	Rt. Hon. Ed. Heneage, M.P.	W. Waller	July 24
School Buildings	Rowley Regis Sch. Bd.	J. T. Meredith	do.
Brick Culvert	Sheffield Corporation	C. F. Wike	do.
Additions to School Buildings, near Leeds	Kippax Board School	Bromet & Thorman	do.
*Erection of Cartshed	Wandsworth B. of W.	*Official*	do.
*Repairs and Alterations to Pier	Gravesend Terrace Pier Co. Lim.	J. J. Robson	do.
Sewerage Works	Sheffield Corporation	C. F. Wike	July 25
Buildings at Electricity Works (Contract No. 3.)	Bolton Corporation	Hinnell & Murphy	do.
*Technical School Buildings, Winsford, Cheshire	Trustees of Verdin Trust Fund	Woodhouse & Willougby	do.
Sewering, Paving, &c. Several Streets	Sheffield Corporation	C. F. Wike	do.
Street and Road Work	West Hartlepool Corp.	J. W. Brown	do.
Canal Diversion, Salford	L. & Y. Ry. Co.	*Official*	do.
*Re-instatement of Pipe Sewer	Camberwell Vestry	do.	do.
*Broken Granite	St. George the Martyr Vestry	do.	do.
*151,500 Jarrah Wood Blocks		do.	do.
*Repairs to Roads		do.	do.
Water Supply and Drainage, Millbrook	St. German's U.R.S.A.	H. Masterton	July 28
School Buildings, Laundry, &c. Barry, Cardiff		W. H. Dashwood Caple	do.
*Laying Pipe Sewers	Twickenham Loc. Bd.	G. B. Laffan	do.
*School With Laundry, &c.	Barry Intermediate S.	W. H. D. Caple	do.
*Making-up Roads	Vestry of Fulham	W. Sykes	do.
*Granite	West Ham Union	*Official*	do.
*Making-up Street and Laying Concrete Flags	Walthamstow L.B.	G. W. Holmes	July 28
*Steam Rolling	do.	do.	do.
*Out-building and Greenhouse	Streatham Burial Bd.	W. N. Dunn	July 31
Sewage Disposal Works, Samlesbury	Blackburn Corp.	J. B. McCallum	do.
Landing Stage at the Pier	Eastbourne Pier Co.	F. E. Robinson	do.
*Additions to Shoemakers' Shops, Darenth	Met. Asylums Board	A. & C. Harston	Aug. 1
Alterations to Post Office, Drogheda	Office of Public Works Dublin	*Official*	do.
Additions to School Buildings	Ludgvan (Cornwall) School Board	do.	Aug. 3
Asylum Buildings, Letterkenny, Ireland	Com. of Control, &c. of Lunatic Asylums	W. Elwee	do.
*Works of New Water Supply, Tetbury			Aug. 8
*Main Drainage Works	Maidenhead, Boro of.	C. N. Lailey	Aug. 14
Store, Houses, Stables, &c. Smith-street	Rochdale Equitable Pioneers Soc. Ltd.	S. Butterworth & Duncan	No date
Two Semi-detached Villas, Bangor, Ireland	Mr. Ibbotson	Thos. Pentland	do.
Semi-detached Villas, Newport (Mon.)	T. James	Swash & Bain	do.
Slaughter House, &c.	Accrington and Church Indus. Co-op. Soc. Ld.	Haywood & Harrison	do.
*Painting Works, Netley Hospital	War Department	*Official*	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Engineer	School Bd. for London	2*l.* 10*s.*	July 18
Road Surveyor	Hawkshead (Cumld.) Highway Board	100*l.* per annum	July 20
Surveyor, &c.	Amesbury (Wilts) U.	150*l.* per annum	do.
*Temporary Assistant	Llandudno Impt Com.	2*l.* 10*s.*	July 22
*Engineer and Chief Surveyor	Tottenham Loc. Bd.	... ...	July 25
*Clerk of Works	Buralem Corporation	3*l.* 3*s.*	do.
*Temporary Assistant Sanitary Inspector	Wandsworth Board of Works	2*l.* per week	do.
Clerk of Works, Torpoint	St. German's U.R.S.A.		July 26
*Inspector of Nuisances and Surveyor	Godstone U.R.S.A.	170*l.*	July 27

Those marked with an Asterisk (*) are advertised in this number. *Competitions, p.* iv *Contracts pp.* iv., vi., viii., *and* xxiii. *Public Appointments, pp.* xx. *and* xxiii.

is going to speak. Secondly, there is none of the trouble of speaking through the tube, and then applying the ear to it for the answer; a conversation is carried on with the mouth always at the tube, and branch ear-piece always at the ear. The sounds produced by the speaker at the other end are prevented from issuing to any extent through the mouthpiece at the listener's end, and being thereby lost to his ear, by the insertion of a hollow cone in the mouthpiece with its apex towards the speaker, and a slit left all round between its base and the neck of the tube; the cone directs the impulse of air from the speaker towards the slit, but on the contrary checks the impulse of air from within the pipe (the reply), so that is heard mainly in the ear-piece. The greatest advantage of the Homacoustic installation is that no multiplication of mouthpieces is required; one only is used in each room, and a revolving plate called a "commutator" (a phraseology borrowed from electrical engineering) puts the mouthpiece in connexion with any tube that is desired, the names of the rooms being marked on the exterior plate of the commutator. Nothing could be neater and more compact, by contrast with the array of mouthpieces we are accustomed to see in large offices, and the enhanced convenience in conversing is unmistakable. The tubes used are of a metal composition which is considered to carry sound better than other materials that have been tried, as well as being more durable.

RENDLE'S GLAZING.—Messrs. W. E. Rendle & Co. ask us to say that the skylights at the Battersea Town Hall and at the Yorkshire College (Leeds) School of Medicine (both of which buildings were illustrated and described in our last issue) were glazed on Rendle's patent system.

CAPITAL AND LABOUR.

THE CARLISLE PLUMBERS' DISPUTE.—The journeymen plumbers of Carlisle, who in March last struck work for an increase of wages from 7½d. to 8½d per hour, agreed recently with the masters to refer the question of wages and various other points in dispute to the arbitration of Mr. G. D. Oliver, architect, Carlisle. Mr. Oliver has just issued his award, the result of which leaves the wages to be paid the same as those paid before the strike—viz., 33s. per week of 54 hours.

CARPENTERS' STRIKE IN SHEFFIELD.—The majority of the carpenters and joiners in the Sheffield district have come out on strike. Some three years ago the men prepared a number of rules, which were accepted by the masters and signed. This bound both parties to give six months' notice of any alteration, and at the beginning of the year the men informed the masters that on July 1 they wished wages to be raised from 8d. to 8½d. per hour. The employers did not signify their acceptance of the new rule, but later on forwarded some alterations they proposed. They wish to reduce the working hours per week to 47 in winter instead of 49½, and offer to raise the pay by ¼d. per hour. They refuse, however, to make any advance in the rate of payment for overtime. The men decided that they could not accept the proposals of the employers.

STRIKE IN THE DERBY BUILDING TRADE.—In accordance with notice given in January last, 160 bricklayers, belonging to the Operative Bricklayers' Society, Derby, together with a number of labourers have come out on strike. The bricklayers are demanding 8½d. per hour, instead of 8d., whilst the labourers ask for 5½d. instead of 5d. Both sections of workmen also ask for certain alterations in the rules of the trade. The principal concession applied for with respect to the rules is that they shall work less hours per day. This the employers are willing to grant, but they cannot see their way to increase the men's wages.

STRIKE IN THE BLACKBURN BUILDING TRADE.—The master painters of Blackburn have decided to support the Employers' Federation by locking out all their men. This has thrown upon the streets over 1,000 men. The lock-out is due to the plasterers' demand for an increase of wages. There is no sign of an immediate settlement of the dispute.

MEETINGS.

FRIDAY, JULY 14.

Royal Archæological Institute.—Visit to Hampton Court Palace in the morning. Evening meeting at Burlington House, 8.30.

Incorporated Association of Municipal and County Engineers.—Annual Meeting at West Bromwich.

SATURDAY, JULY 15.

Architectural Association.—Visit to Penshurst-place, Kent. Trains 9.30 a.m. and 2 p.m. from Charing Cross.

Royal Archæological Institute.—Meetings at Burlington House in the morning. Visit to Eton College in the afternoon.

Incorporated Association of Municipal and County Engineers.—Annual Meeting (concluded).

Liverpool Engineering Society.—Excursion to the Penmaenmawr Granite Quarries.

MONDAY, JULY 17.

Royal Archæological Institute.—Visit to City churches built by Sir C. Wren. In the evening, reception by the London and Middlesex Archæological Society.

TUESDAY, JULY 18.

Royal Archæological Institute.—Visits to the Temple Church, and to St. James's and Buckingham Palaces.

WEDNESDAY, JULY 19.

Japan Society.—Mr. George Cawley on "Wood and its Application to Japanese Artistic and Industrial Design." 8.30 p.m.

Royal Archæological Institute.—Visit to Windsor Castle.

Builders' Foremen and Clerks of Works Institution.—Half-yearly meeting of the Members. 8.30 p.m.

THURSDAY, JULY 20.

Builders' Benevolent Institution.—General Annual Meeting. 3 p.m.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

9,868.—FIRE-PLACES: *C. Walter* (Malchow).—The device which is the subject of this patent is designed to close the register automatically. After it has been opened, when the fire-place has been charged with fresh fuel, it is automatically closed, if desired, to a limited or regulated extent. The register is held by a piston, with a water column bearing thereon; this water column gradually

diminishes, decreasing the pressure upon the piston so that the register moves with gradually-increased velocity to the closed position.

9,924.—DRAINS AND SEWERS: *W. J. Bosley.*—When drains are to be stopped, or a head of water created, this method completes, first, a joint between sewer and drain pipes, by means of an india-rubber ring fixed in a cylinder; and provides also lugs or flanges to prevent undue strain from the pressure of water.

11,411.—METHODS OF BUILDING: *J. Dougan and Another.*—This specification refers to what is described as an improved method of building in concrete or with plates or slabs. Elaborate means for fixing, &c., are described in the specification, and they are so arranged that the erection may be taken to pieces and re-erected, if necessary, without injury to the plates or slabs. These slabs may be used in combination with stone or any other building material, or, instead of lath and plaster, or for forming ornamental decorations in relief.

12,746.—AUTOMATIC FLUSHING APPARATUS: *W. S. Freeman.*—This patent relates to some mechanical improvements in this class of apparatus to ensure greater accuracy and efficiency.

12,854.—WOOD-MANTELS: *J. Parker.*—In mantels, constructed according to this patent, the frieze and shelf are connected to the jambs so that the parts are movable and interchangeable, affording great convenience for packing the parts closely for transport, and also providing means for setting up a mantel adjusted to the exact width of the opening before which it is fixed.

7,303.—DRYING BRICKS, TILES, &c., BY HOT AIR: *C. A. L. Brinkmann* (Itzehoc). — This specification describes a kiln designed to obviate the common defect of hot air or gas kilns that evaporate the moisture from the goods in one part, and precipitate it upon the goods in a cooler part of the kiln. Loss of time and waste of fuel is prevented by this improved method.

8,431.—SAW BLADES: *G. Székély* (Lutilla).—On the back of the saw blade, which is the subject of this patent, planing teeth are set. These are wider than the saw teeth, so that with each movement of the blade the sharpened edges of the teeth smoothly plane the rough surface left by the saw teeth.

NEW APPLICATIONS FOR LETTERS PATENT.

JUNE 26.—12,494, H. Chubb, Waste Preventing and Flushing Cisterns for Water-closets, &c.—12,519, G. Mecenero, Sanitary Ventilation.—12,527, H. Hughes, Stained Glass Windows or Panels.

JUNE 27.—12,536, W. Callow, Water Waste Preventer.—12,540, J. Naylor, Lead Traps.—12,546, G. Leal, Disinfecting Apparatus for Water-closets, &c.—12,584, P. Bilstein, Fire-proof Plates or Slabs.—12,618, A. Burgiss and R. Wilson, Window Sashes.—12,622, J. McIntyre, Pipe Fittings.

JUNE 28.—12,639, E. Green, Channel Blocks and Reducing Couplings for Manholes and Inspection Chambers in Connexion with Pipe Sewers and Drains.—12,643, J. Pearson, Apparatus for Moistening Air and Ventilating Purposes.—12,679, F. Smale, Window Sashes.—12,686, A. Boult, Malting Floors.—12,692, M. Negus and J. Stanford, Bakers' Ovens.—12,703, J. Kohn, Lattice or Open-work Girders.

JUNE 29.—12,765, H. Taylor, T Squares.—12,770, W. Lindsay, Construction of Window Sashes.—12,773, T. Wallace, Hanging Cupboard or Wardrobe.—12,781, J. Horsley, Nail or Screw for use on Fences.—12,790, F. Podamy, Cutting Veneer.—12,791, E. Edwards, Paint.

JUNE 30.—12,804, A. Wright, Laths and Sheets for forming Ceilings, Floors, Partitions, &c.—12,807, J. Morton, Opening and Closing Skylights, Fanlights, &c.—12,867, R. Lewis and J. Newman, Water-closets.

JULY 1.—12,880, R. Bammann, Production of Marble-like Plaster.—12,883, A. Adcock, Fastening for Doors, &c.—12,915, G. Ewart and others, Metal Roofing.

PROVISIONAL SPECIFICATIONS ACCEPTED.

9,363, W. Tuffee, Inspection and Cleaning Branch Chamber for Junctions of Soil and Rain-water Pipes with Drains.—10,117, H. Cleaver, Applying Paints, Varnishes, or Stains to Surfaces.—10,271, F. Golby, Removable Scaffolding.—10,564, E. Williams, Construction of Baths.—10,690, F. Le Rossignol, Water-closet Ventilation.—11,098, H. Tugby, Stoneware Sanitary Pipes, &c.—11,165, H. Sydner, Holding Builders and other Gauge Lines in position.—11,257, D. Fitzmaurice, Taps.—11,304, H. Sutcliffe, Flushing Cisterns for Water-closets, Urinals, &c.—11,341, W. Whitley and W. Longbottom, Cramps for Use in the Manufacture of Doors, &c.—11,362, W. Birkenshaw, Heads for Picks and similar Tools.—11,444, C. Plowden, Metal Paving Sets or Blocks.—11,611, A. Mallock, Screwdrivers.—11,701, J. Wallwork, Chimney Pots or Cowls Ventilators, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

15,340, J. T. & J. Vicars, Bakers' Ovens.—15,389, The Bostwick Gate and Shutter Co., Limited, & W. Williamson, Folding or Collapsible Gates, Shutters, Window Guards, and the like.—23,964, J. Wright, Sash-Fastener.—9,190, H. Weiss, Devices for Adjusting the Opening of Windows.—10,282, H. Boult, Dovetailing Machines.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JULY 3.—By *G. A. Wilkinson & Son:* 92, 94, 96, Torriano-av., Kentish Town, u.t. 51 yrs., g.r. 18*l.* 18s., r. 122*l.*, 820*l.*; 23, Egerton-rd., Greenwich, u.t. 72 yrs., g.r. 5*l.*, 290*l.*—By *J. Baker & Son:* "Ivy Lodge," Shoot-up-Hill, Cricklewood, f., r. 65*l.*, 1,730*l.*—By *J. Hibbard & Sons:* 13, Crawthew Grove, Dulwich, f., 250*l.*; 36 to 42 even, and 46, Archdale-rd., f., 965*l.*; "Rumney's Cottages," Parsonage Lane, Enfield, f., 400*l.*; 38 and 40, Walpole-st., New Cross, f., 535*l.*—By *Messrs. Cronk:* F. land, Crowborough, Sussex, 18 a. 3 r. 32 p., 900*l.*; 19 a. 0 r. 31 p., "Towner's Hill Farm," f., 900*l.*; two plots of land, 4 a. 0 r. 39 p., 355*l.*—By *King & Chasemore:* F. land, near Leith Hill, 11 a. 2 r. 30 p., 400*l.*; "Hailsbridge Farm," 200 a. 3 r. 37 p., f., 2,450*l.*

JULY 4.—By *G. Brinsley:* "Poucher's Farm," near Braintree, 297 a. 1 r. 5 p., f., subject to heavy deductions, 550*l.*—By *Montague & Robinson:* 20, Prince's-st., Spitalfields, f., r. 75*l.*, 1,350*l.*; 46, Greenwood-rd., Dalston, u.t. 59 yrs., g.r. 7*l.*, 350*l.*; 47, Buxton-st., Mile End, u.t. 54 yrs., g.r. 14*l.*, r. 47*l.*, 170*l.*—By *Mullett, Booker, & Co.:* 46, Princes-rd., Notting Hill, u.t. 56 yrs., g.r. 6*l.* 5s., r. 25*l.*, 150*l.*

JULY 5.—By *W. Houghton:* 23, Blackmore-st., Drury Lane, f., 900*l.*; 2, Vere-st., f., r. 50*l.*, 880*l.*; 14, Holles-st., f., r. 38*l.*, 800*l.*; 8, Copeland-rd., Walthamstow, f., 260*l.*

JULY 7.—By *Harman Bros.:* No. 37, Hampstead-rd., the lease and goodwill, u.t. 8 yrs., 500*l.*—By *Jones, Lang, & Co.:* 6, 8, 15, Milbourne-st., Hackney, f., r. 88*l.* 8s., 800*l.*—By *E. & S. Smith:* 2, 3, Noble-st., Clerkenwell, u.t. 23 yrs., g.r. 22*l.*, 180*l.*; 106, Murray-st., Hoxton, u.t. 49 yrs., g.r. 5*l.* 5s., r. 34*l.*, 355*l.*—By *Buckland & Sons:* 8, Norland Stables, Kensington, f., r. 50*l.*, 800*l.*—By *Furber, Price, & Co.:* No. 21, Kentish Town-rd., u.t. 36 yrs., g.r. 4*l.* 4s., 420*l.*; No. 61, Edgware-rd., and stabling, u.t. 23 yrs., g.r. 18*l.*, r. 120*l.*, 1,120*l.*—By *A. Savill & Son:* "Borley House Farm," Fobbing, Essex, and 190 a., f., 710*l.*; f. land, Fyfield, Essex, 36 a. 0 r. 11 p., 640*l.*

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.			TIMBER (*continued*).		
Greenheart, B.G. ton	9/0/0	0/0/0	Walnut, Italian ..	0/0/3½	0/0/7
Teak, E.I. ..load	9/0/0	15/0/0	**METALS.**		
Sequoia, U.S.ft.cu.	2/3	2/6	Iron—Pig, in Scotland .....ton	2/1/7½	0/0/0
Ash, Canada load	3/0/0	4/5/0	Bar, Welsh, in London	5/17/6	6/0/0
Birch, do.	2/10/0	3/10/0	Do. do. at works in Wales.....	5/7/6	5/10/0
Elm, do.	3/15/0	5/0/0	Do. Staffordshire, in London	6/0/0	6/10/0
Fir, Dantsic, &c.	1/10/0	3/0/0	COPPER—British, cake and ingot	46/15/0	47/5/0
Oak, do.....	3/5/0	5/10/0	Best selected ..	47/10/0	48/0/0
Canada	5/15/0	6/15/0	Sheets, strong..	55/0/0	0/0/0
Pine, Canada red	2/10/0	3/0/0	Chili, bars	42/15/0	43/2/6
Do. Yellow	2/10/0	4/15/0	YELLOWMETALlb	0/0/4½	0/0/5
Lath, D'ntsic, fath	4/10/0	5/10/0	LEAD—Pig, Spanish.....ton	10/5/0	10/7/6
St. Petersburg..	5/0/0	6/10/0	English com. brands	10/7/6	10/10/0
Deals, Finland 2nd & 1st std 100	7/0/0	9/10/0	Sheet, English, 6 lbs. per sq. ft. and upwards,...	11/15/0	0/0/0
Do. 4th & 3rd ..	6/10/0	7/0/0	Pipe.....	12/5/0	0/0/0
Do. Riga	6/10/0	8/0/0	ZINC—English sheet.....ton	22/0/0	0/0/0
St. Petersburg, 1st yellow '...	9/10/0	13/10/0	Vieille Montagne	22/10/0	0/0/0
Do. 2nd yellow..	7/10/0	8/10/0	TIN—Straits.....	82/10/0	83/0/0
Do. white	8/0/0	10/0/0	Australian.....	84/10/0	85/0/0
Swedish	7/10/0	15/10/0	English Ingots..	88/0/0	88/10/0
White Sea.....	7/10/0	16/0/0	Banca.....	86/0/0	86/10/0
Canada, Pine 1st	21/0/0	28/10/0	Billiton	85/0/0	85/10/0
Do. do. 2nd	16/0/0	17/10/0	**OILS.**		
Do. do. 3rd &c.	7/10/0	10/5/0	Linseed .....ton	20/15/0	20/17/6
Do. Spruce, 1st	8/10/0	11/0/0	Cocoanut, Cochin	29/0/0	29/10/0
Do. 3rd & 2nd	6/10/0	8/0/0	Do. Ceylon	27/0/0	27/10/0
New Brunswick	6/0/0	13/0/0	Palm, Lagos.....	26/0/0	0/0/0
Battens, all kinds	3/0/0	15/0/0	Rapeseed, English pale	24/15/0	25/0/0
Flooring boards, sq., 1 in. prep. 1st.....	0/10/0	0/15/0	Do. brown	23/5/0	0/0/0
Do. 2nd	0/8/0	0/12/0	Cottonseed ref....	22/0/0	0/0/0
Other qualities—	0/5/0	0/7/6	Oleine.....	22/0/0	23/10/0
Cedar, Cuba ..ft.	/4	/4½	Lubricating, U.S.	4/0/0	5/0/0
Honduras, ..&c	/4	/4½	Do. refined	5/10/0	12/0/0
Mahogany, Cuba	/4	/6½	TAR—Stockholm barrel	0/18/6	0/0/0
St. Domingo, cargo av.	/4	1/6	Archangel.....	0/12/6	0/0/0
Mexican do. do.	/3½	/4½			
Tobasco do. do.	/3½	/6½			
Honduras do. ..	/4½	/6			
Box, Turkey ton	4/0/0	13/0/0			
Rose, Rio	9/0/0	20/0/0			
Bahia	8/0/0	18/0/0			
Satin, St. Domingo .....ft.	0/0/6	0/1/3			
Porto Rico.....	0/0/7	0/1/6			

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.*]

ABBOTS LANGLEY (Herts).—For repairs, &c., to the Manor House, Abbots Langley, for Mr. John Ward. Mr. Arthur Ardron, architect, 39, Victoria-street, Westminster:—

Tavener & Sons.....£225	Dove & Co. £218

AMBLE (Northumberland).—Accepted for the erection of Congregational Church. Mr. George Reavell, jun., architect, Alnwick:—

R. & G. Brown £1,891 14 5	

BOSTON (Lincolnshire).—For the erection of a house on the West-street-road. Mr. Jas. Rowell, architect, Boston:—

Bricklayer, Mason, Slater, Plasterer, and Joiner.

C. Jessop £490		H. Hinds £450	
Hill & Son 489		J. Lucas 420	
Guider & Son..... 489		H. W. Parker (accepted) .. 380	

Plumber, Gasfitter, Glazier, and Painter.

A. E. Griffin (accepted) £52 0 0

[All of Boston.]

BOSTON (Lincolnshire).—Accepted for the erection of a store and net braiding room; also iron sheds at Boston Dock, for the Steam Trawling Company of Boston. Mr. Jas. Rowell, architect, Boston:—

For Brick-Built Store.

H. W. Parker.....£120 0 0

For Iron Sheds.

J. Lucas £115 0 0

[Accepted in competition; both of Boston.]

BRACKNELL (Berks).—For erecting new post office and house for Mr. J. Bartlett. Mr. A. E. Sidford, architect, Wokingham:—

Newberry £1,558		Fitt £1,267	
Watson 1,400		Wernham 1,265	
Murrell 1,389		Seward 1,187	
Goodchild 1,270			

BRAMLEY (Surrey).—For building four cottages for Mr. T. Luff, Godalming. Mr. B. Booth, surveyor:—

W. Edwards £459 0	F. Chambers £432 0
J. Ollwin..... 452 10	

[Surveyor's estimate, £460; all bricks found by the proprietor.]

BRISTOL.—For making up Oak-road, Salthrop-road, and Morley-square, Horfield, for the Local Board. Mr. A. P. J. Cotterell, C.E., Lonsdale-chambers, Baldwin-street, Bristol:—

	Oak-road.	Morley-sq.	Salthrop-rd.
W. Mereweather ..	£490 0 0	£124 0 0	£389 0 0
W. Thomas.....	406 7 4	139 6 6	298 17 10
W. G. Rogers, Durdham Down, Clifton	340 0 0*	61 2 6*	188 0 0
G. H. Wilkins, Thomas-street, Bristol*.....	243 0 0	67 0 0	220 0 0
J. & W. R. Gilbert	..	82 2 6	260 1 9
F. Scutt.....	..	76 6 0	254 2 0

* Accepted.

CASTLEFORD.—Accepted for paving, &c., Temple-street, for the Local Board. M. J. D. Lewis, Surveyor, Carlton-street, Castleford:—

Thomas Lane, Lincoln £1,764 3 0	

CHIDDINGFOLD (Surrey).—For additions and alterations to the "Old Crown Inn." Mr. B. Booth, surveyor. Quantities supplied:—

Stanley Ellis	£452 0	J. W. Humphery	£415 0
W. Ransom	429 0	Luff & Bookham, Chiddingfold (accepted)..	399 10
F. Milton.....	426 0		
W. Page	420 0		

[Surveyor's estimate, £425.]

EAST MOLESEY.—For the construction of 14,000 yards of stoneware pipe sewers, shafts, &c., also pumping-station, engine and boiler houses, &c., for the East Molesey Local Board. Mr. J. C. Melliss, Engineer, 232, Gresham House. Old Broad-street, E.C.:—

A. Kellett.....£27,212		J. Neave £23,838	
G. Ossenton 26,461		B. Cooke & Co., Phœnix Wharf, Battersea *.. 23,382	
J. Hayward..... 26,169			
J. Dickson 24,267			

* Accepted.

EDINBURGH.—Accepted for alterations to the Old Vennel Church, Grassmarket, Edinburgh, for General Booth. Mr. J. Williams Dunford, architect, 109c, Queen Victoria-street, E.C.:—

T. Morgan, Wood Green £892 0 0	

HAYES (Kent).—Accepted for repairs to private residence. Mr. St. Pierre Harris, architect, 1, Basinghall-street:—

W. Smith, Bromley £100 0 0	

[No competition].

HIGH WYCOMBE.—For works in extension of cemetery walling, &c. Mr. Arthur Vernon, architect, 25, Cockspur-street, London:—

Lee £694		Loosley £597	
Flint 687		Hill 518	
Nash 627		Hunt, Wycombe (accepted) 517	

LEYTONSTONE.—For extension of schools to the Baptist Chapel, Cann Hall-road, Leytonstone, E. Mr. Geo. Baines, architect, 4, Great Winchester-street, E.C.:—

H. L. Holloway £1,684		B. E. Nightingale £1,489	
Harris & Wardrop..... 1,673		Battley, Son, & Holness .. 1,447	
S. J. Scott..... 1,630		F. & H. F. Higgs 1,389	
A. Black & Son 1,600		F. J. Coxhead, Leyton stone (accepted) 1,287	
Staines & Son 1,598			
Holliday & Greenwood .. 1,540			

LONG EATON (Notts).—For forming, kerbing, paving, sewering, &c., a new street, The Hollows, Long Eaton, for the Local Board. Mr. J. Sheldon, Surveyor, Darley House, Long Eaton. Quantities by the Surveyor:—

Martiu £633 9 0		John Brown £375 10 0	
W. Messom 515 0 0		Hawley & Son, likes- ton*..... 360 0 0	
T. Thumbs 392 9 3			

* Accepted.

[Surveyor's estimate, £375 15 0].

LONDON. — For interior cleaning, &c., the Carlton-road Schools, for the School Board for London. Mr. T. J. Bailey, Architect:—

Cruwys.....£663 0		Henry £435 0	
Heatley & Hannan..... 567 0		Dudley 421 0	
Stevens Bros..... 499 10		White, Alton, & Co. 355 10	
Marchant & Hirst 465 0			

LONDON.—For interior cleaning, &c., at the Moreland-street School, for the School Board for London. Mr. T. J. Bailey, Architect:—

Kirby & Chase £320 0		McCormack £234 0	
Davenport 269 0		Marchant & Hirst 228 0	
Hornett 258 10		Johnson & Co..... 189 0	
Grover & Son 254 0		Taylor 187 0	
Cruwys 245 0			

LONDON.—For exterior cleaning, &c., at the Drury-lane School, for the School Board for London. Mr. T. J. Bailey, Architect:—

Eyers £148 0		Hornett.....£95 0	
Johnson 112 0		Marchant & Hirst..... 79 15	
Vigor 98 0			

LONDON.—For exterior painting at Campbell-street School, for the School Board for London. Mr. T. J. Bailey, Architect:—

Sparks £141 0 0		Eady £105 7 6	
Chinchen 119 9 0		Marchant & Hirst 97 0 0	
Clifton 110 0 0			

LONDON.—For exterior painting, &c., at Fox School, Notting Hill, for the School Board for London. Mr. T. J. Bailey, Architect:—

Mowlem & Co. £235 12		Marchant & Hirst £81 10	
Chinchen 109 0		Macey & Sons 75 0	
Polden 108 10			

LONDON.—For exterior painting, &c., at Cranbrook-road School, for the School Board for London. Mr. T. J. Bailey, Architect:—

Corfield £310 0		Prout.....£264 0	
Britton..... 281 3		Marchant & Hirst 249 10	
Knight & Son 272 0			

LONDON.—For rebuilding premises for City Association, Burgon-street. Mr. J. W. Innes, architect:—

Lidstone.....£2,460		Patman & Fotheringham..£2,091	
J. Greenwood 2,420		Spencer & Co..... 2,025	
Hall, Beddall 2,300		Howell J. Williams 1,988	
Clarke & Bracey..... 2,273		Balaam Bros. 1,855	

LONDON.—For alterations and additions to No. 41, Princes Gardens, S.W. Mr. John W. Simpson, architect, 10, New Inn, Strand, W.C. Quantities by Messrs. Pinks & Watson:—

W. Wallis £2,615		Johnson & Co.....£2,460	
Holloway Bros. 2,523		Stimpson & Co. 2,350	
Killby & Gayford 2,461		King & Son 2,300	

LONDON.—For the erection of a warehouse at Narrow-street Limehouse. Mr. M. N. Inman, architect, 7, Bedford-row, W.C.:—

J. H. Johnson £5,331		Simpson & Son £4,789	
C. Kearley 5,300		Chessum & Sons 4,695	
Clarke & Bracey 5,191		Brown, Son, & Blomfield 4,573	
Grover & Son 4,892			

LONDON.—For alterations, additions, and repairs at No. 54, Queen Anne-street, W. Mr. Frank M. Elgood, architect:—

Shaw £1,625		McSwiney.....£1,531	
Longmire 1,545			

LONDON.—For alterations, repairs and drainage at No. 8, Bedford-row, W.C., for Messrs. Shaen Roscoe & Co. Messrs. Bray, Dickins, & Co., surveyors, 6, Warwick Court, High Holborn, W.C.:—

Hall, Beddall, & Co. £600		T. Wontner Smith& Son ..£357	
G. Larner & Co. 397		A. Webber & Co. 326	
J. Anley 388		Patman & Fotheringham .. 321	

LONDON.—For dairy premises, stables, &c., at N. Finchley, Middlesex. Mr. J. W. Lane, architect, 39, Great James-street, Bedford-row. No quantities:—

Macfarland Bros. £2,390		Wheeler & Peake £2,295	
Wells 2,388		Woodhall 2,210	
Pointing 2,320		Voller 1,960	

LONDON.—For five houses in Broomfield-road, Bowes Park, Middlesex, N., for Mr. W. Cox. Mr. J. W. Stevens, architect, 22, New Bridge-street, E.C. Quantities supplied :—

Grover	£1,761	Wade	£1,644
Pocock	1,755	Castle	1,547
Gladwell	1,749	Voller	1,439
Hawarth	1,697	Woodhall	1,420
Jefferies	1,681	Knight	1,190
Houghton	1,673	Prout	994

LONDON.—For the erection of All Saints' Church, Davey-street, North Peckham. Mr. Walter Planck, architect, 33, Beauchamp-road, S.W. Mr. Wm. George Edwards, surveyor :—

S. Wood	£10,801	W. Smith	£9,431
H. L. Holloway	9,933	Smith & Sons, Norwood *	9,365
B. E. Nightingale	9,880	T. H. Kingerlee	9,309
Braid & Co.	9,614	Parker (too late)	—

*Accepted.

LONDON.—For warehouse, 31A, Caledonian-road, for Messrs. Harpham. Mr. George Judge, architect :—

T. Boyce	£1,470	W. Ebbage	£1,350
H. W. Say	1,459	James Pocock *	1,197
Josolyne & Young	1,445		

*Accepted.

LONDON.—Accepted for schools to the Congregational Church, Greenwich-road, S.E. Mr. Geo. Baines, architect, 4, Great Winchester-street, E. C. :—
F. J. Gorham, Point Hill, Greenwich £1,167 10 10

LONDON.—For alterations, &c., to the Methodist Free Church, Pembury-grove, Hackney, for the trustees. Mr. J. Williams Dunford, architect, 100C, Queen Victoria-street, E.C. :—

Lipscomb	£498	Kellaway	£393
Coxhead	397	Green, Walthamstow *	333

* Accepted.

LONDON.—For additions and alterations to infirmary, Lower-road, Rotherhithe, for the St. Olave's Union Guardians. Messrs. Newman & Newman, architects, 31, Tooley-street, London-bridge, S.E. :—

Bullers	£2,080	Balaam Bros.	£1,730
Richardson	1,960	Lilly & Lilly	1,597
Holloway	1,869		

LONDON.—For alterations and additions to No. 61, Stanhope Gardens, South Kensington, for Mr. R. Morris. Mr. Arthur Ardron, architect, 39, Victoria-street, Westminster :—

Dove & Co.	£1,859	Simmonds Bros.	1,595
Holliday & Greenwood	1,729	Pusey & Limley	1,452

MITCHAM.—For forming new bath room at their schools, Mitcham, Surrey, for the Guardians of the Holborn Union. Mr. H. Saxon Snell, architect, London :—

W. Bamford	£540 0	W. Akers & Co.	£449 0
T. G. Howard	519 0	J. Dickeson	448 10
H. Wall & Co.	489 0	J. O. Richardson *	404 0
W. H Lorden & Son	483 0		

* Accepted.

ORPINGTON (Kent).—For repairs to property, at High-street, Mr. St. Pierre Harris, architect and surveyor, 1, Basinghall-street, E.C. :—

T. Knight	£280 0 0	Stebbings & Pannett,	
W. R. Taylor	233 0 0	Sidcup *	£168 0 0
W. Owen	223 0 0	Somerford & Son	
Osborne & Co.	168 18 3	(withdrawn)	129 0 0

*Accepted in modified form.

ORPINGTON (Kent).—Accepted for the erection of a bungalow residence, "The Covert," Scad's Hill, for Mr. St. Pierre Harris, architect, Orpington :—
Gregory & Co., Clapham £950 0 0
[No competition.]

ORPINGTON (Kent).—Accepted for the erection of a pair of labourers' cottages, and for additions to farm house. Mr. St. Pierre Harris, architect and surveyor, 1, Basinghall-street, E.C. :—
W. Owen, Farnborough £524 10 0
[No competition.]

RUDGWICK (Sussex).—For the construction and erection of a girder bridge over the river Arun, at Wanford Mills, for the Horsham Highway Board. Mr. W. Dengate, surveyor, 58, Park-street, Horsham :—

P. Peters	£431 0 0	I. Ockenden	£363 0 0
Rowland Bros.	429 0 0	Wadey & Son	360 12 6
M. Etheridge	387 0 0	R. Cook & Sons,	
W. Port	380 0 0	Crawley (accepted)	259 0 0

WALTHAMSTOW.—For the erection of a house in Church Hill-road, for Mr. Alfred Cooper. Mr. J. Williams Dunford, architect, 100C, Queen Victoria-street, E.C. :—

Watling	£593	Lipscomb	£480
Sizer	550	Green, Walthamstow *	426
Coxhead	525		

* Accepted.

WEST HAM.—For covered playgrounds to the Regent's-lane Schools, Custom House, E., for the West Ham School Board. Messrs. J. T. Newman & Jacques, architects, 2, Fen-court, E.C. Quantities by Messrs. R. L. Curtis & Sons :—

Catley	£465	Hearle & Farrow	£414
Gregar & Son	450	Fulcher	380
Reed & Son	425	Sharpe	345
Hosking	424	Goodchild *	339

* Accepted subject to the approval of the Education Department.

WEST HAM.—For the erection of new latrines and drainage to the Grange-road Schools, Plaistow. Messrs. J. T. Newman & Jacques, architects, 2, Fen-court, E.C. Quantities by Messrs. R. L. Curtis & Sons :—

Hearle & Farrow	£1,397	Maddison	£1,090
Reed & Son	1,226	Sharpe *	990

* Accepted subject to the approval of the Education Department.

WEST HAM.—For alterations to the Salway-place Schools, Stratford, E. Messrs. J. T. Newman and Jacques, architects, 2, Fen-court, E.C. Quantities by Messrs. R. L. Curtis & Son :—

Noakes	£1,150	Reed & Son	£797
Hosking	849	North Bros.	794
Fulcher	836	Catley *	743
Maddison	827		

* Accepted subject to the approval of the Education Department.

WIMBLEDON.—For alterations and additions at Gothic Lodge, Wimbledon Common, for Mr. W. H. Preece, F.R.S. Mr. Arthur Ardron, architect, 39, Victoria-street, Westminster :—

Simmonds Bros.	£516	Turtle & Appleton	£494
Blackburne	514	Townsend	486
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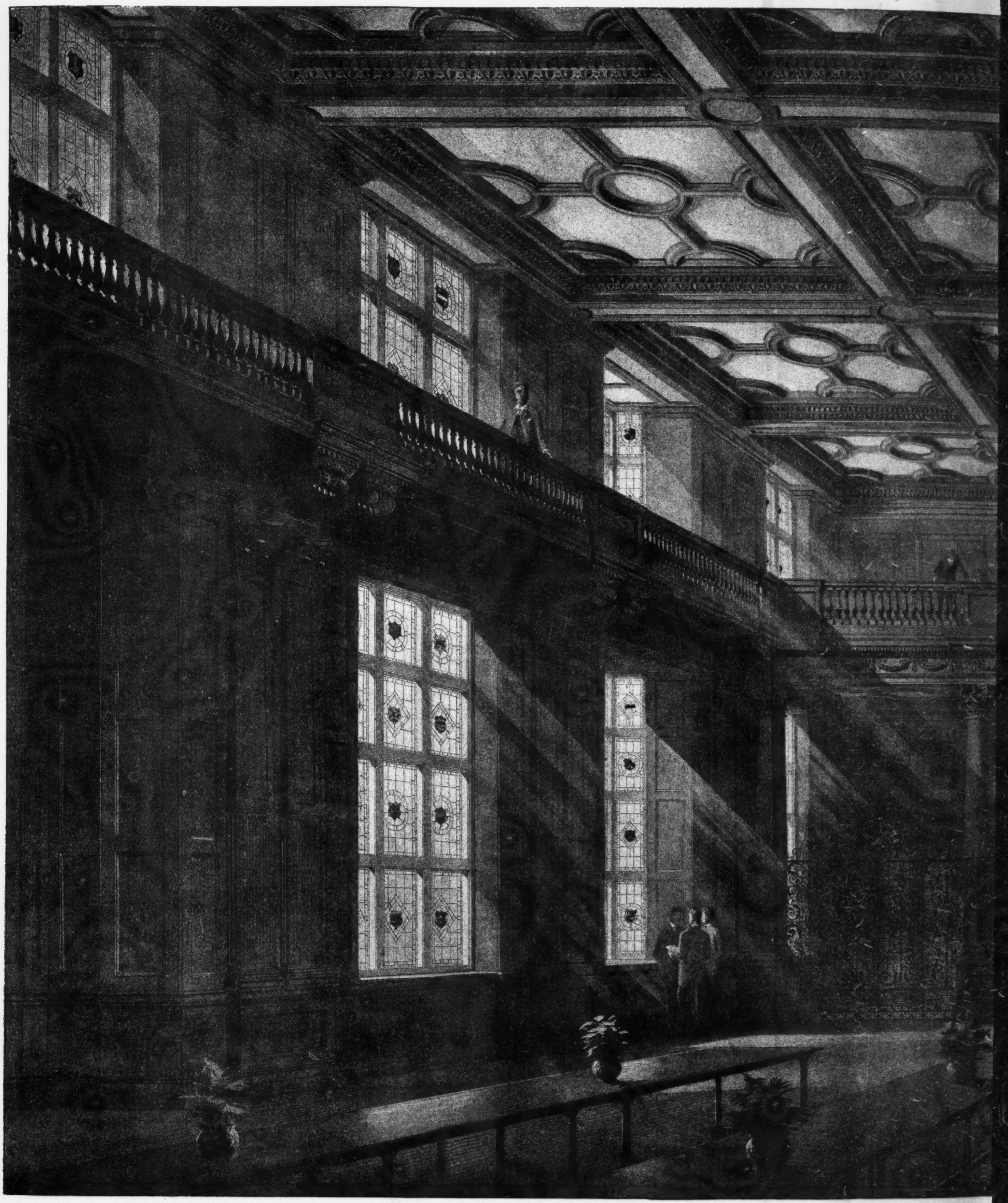

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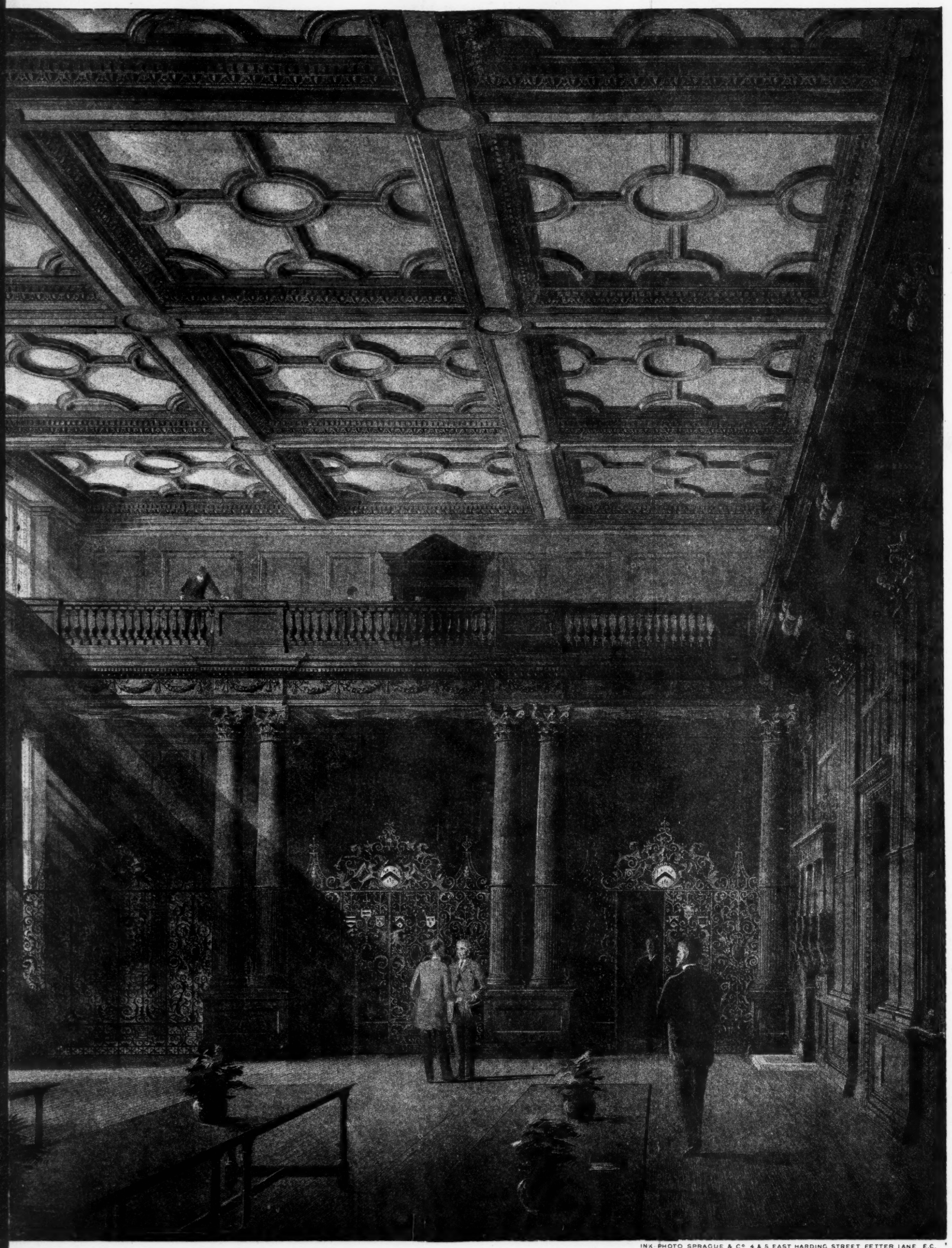

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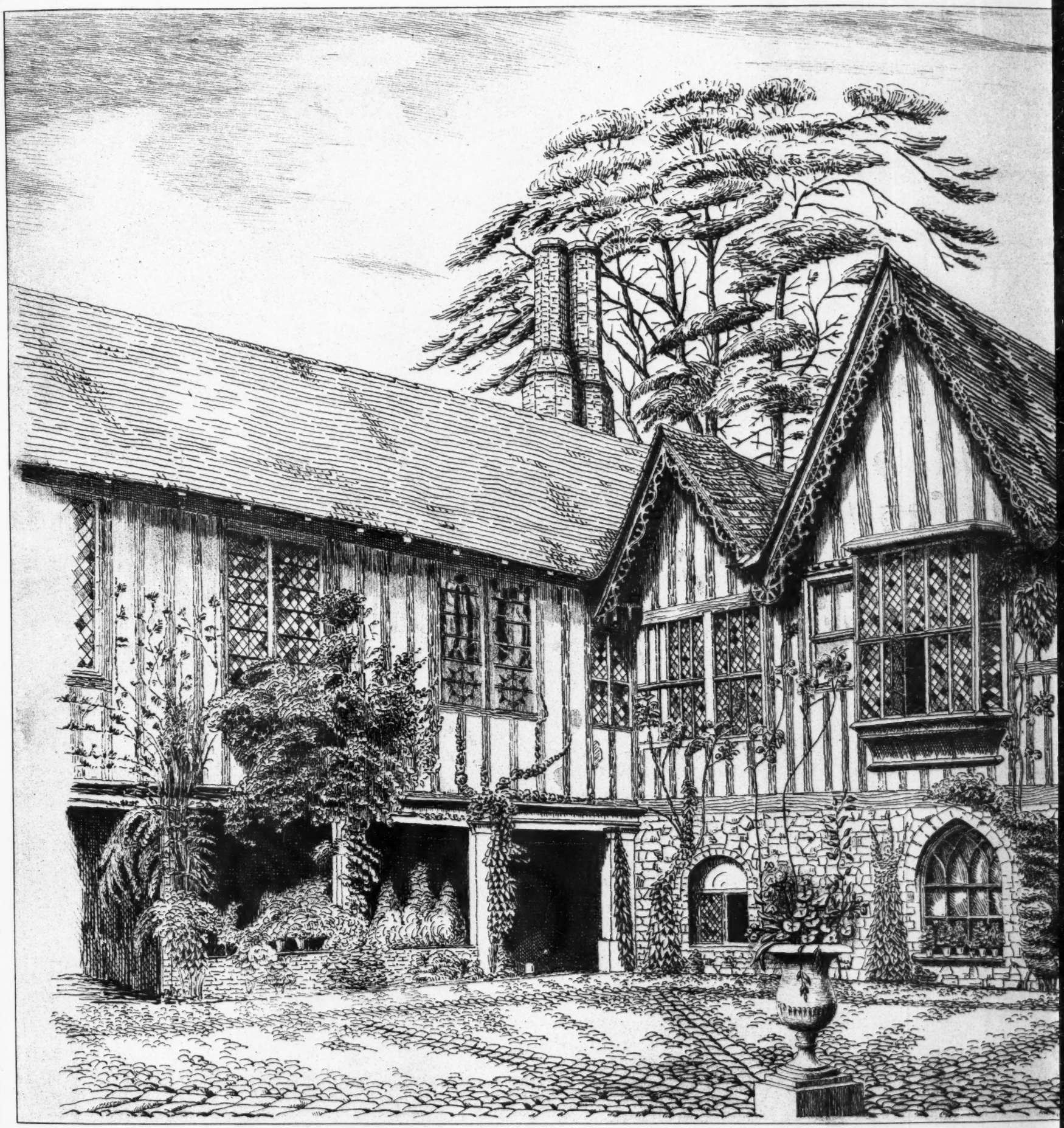

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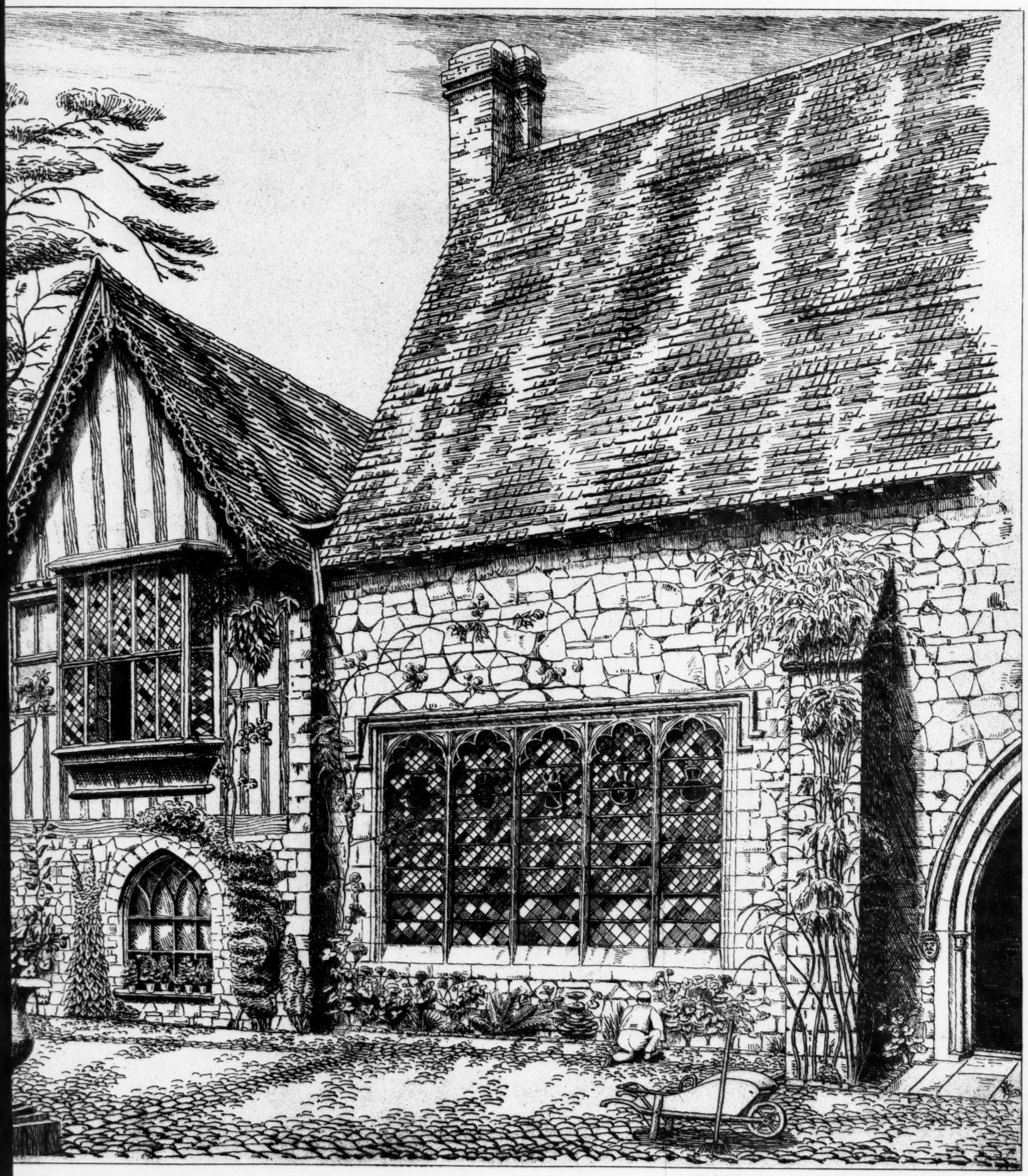

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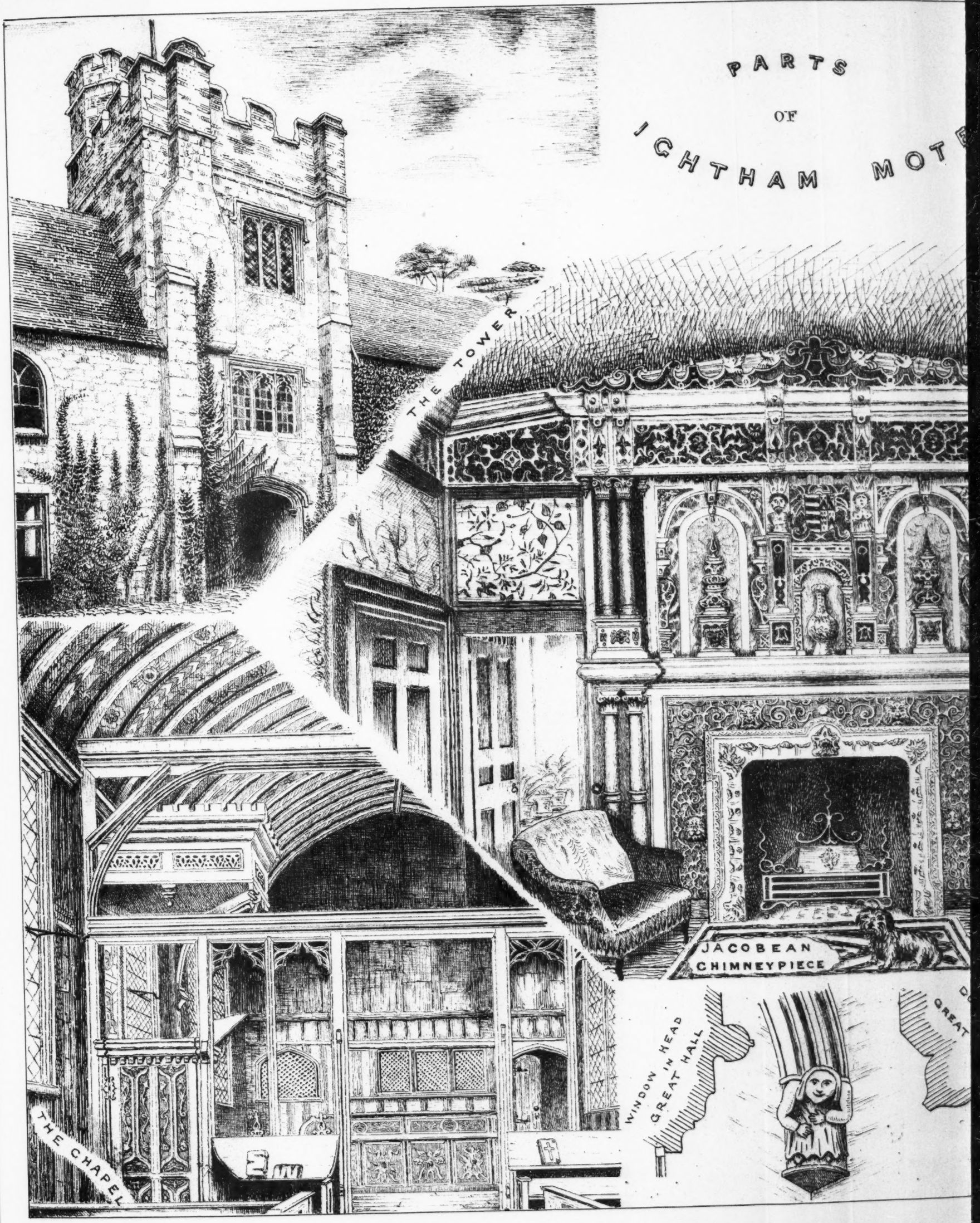

PARTS OF HAM MOTE

CLOCK TOWER

EAN
YPIECE

DOOR JAMB
IN
GREAT HALL

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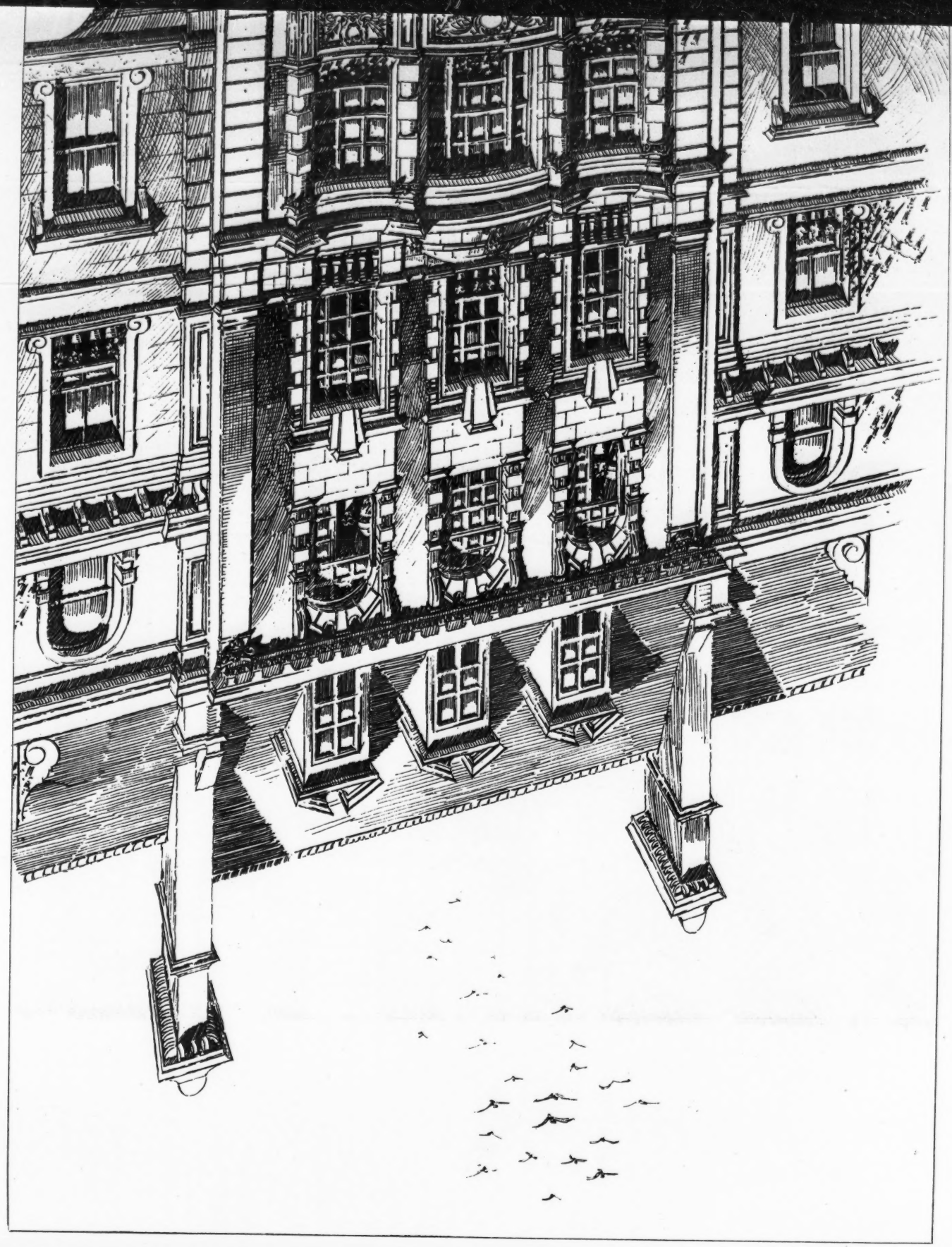

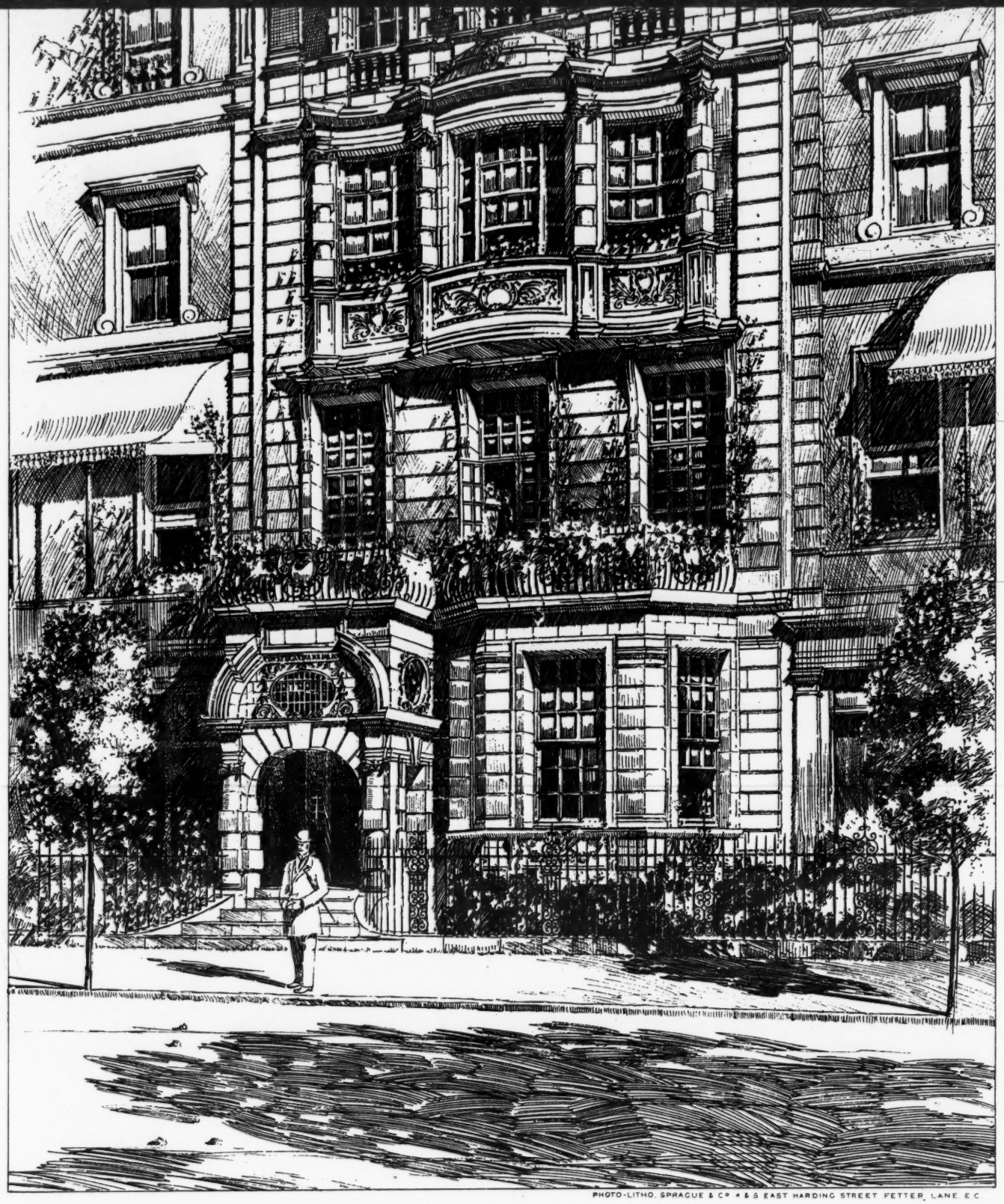

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